American Journal of Public Health
and THE NATION'S HEALTH

Volume 26 July, 1936 Number 7

Vitamin D in Child Health*

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IT is the purpose of this article to review the more recent experimental data on vitamin D and child health, and point out the essential aspects of the public health problem of rickets. The influence of vitamin D upon the child's physical development is viewed from the standpoint of: (1) growth, (2) bone development, (3) tooth development, (4) posture, and (5) resistance to the infections.

GROWTH AND BONE DEVELOPMENT

The importance of vitamin D to normal growth probably depends upon its property of causing the absorption and utilization of lime salts from the food. Since the lime salts are the principal component of bone, and the size of the skeleton determines height and breadth, it follows of necessity, that vitamin D and lime salts are essential to growth.

There are two requisites for the normal development of bone: (1) ample lime and phosphorus in the diet, and (2) sufficient vitamin D to assure their adequate absorption. The vitamin D may be derived from (a) actinic sunshine, (b) artificial ultra-violet light, and (c) foods, either naturally or artificially fortified with this nutritional factor.

TEETH

With respect to tooth development, vitamin D and lime salts in adequate amounts, are both admittedly essential. As to dental decay, however, recent studies [1] seem to be of importance. These consisted of histological examinations of the teeth of 125 pregnant rats kept on rachitic and non-rachitic diets. The following conclusions were drawn:

A deficient calcium-phosphorus ration in the diet of the mothers, with even a partial deficiency of vitamin D caused improperly calcified teeth in the offspring. In this case, later addition of adequate amounts of vitamin D to the diet failed to correct the deficient calcification of the teeth, but did produce normal bone formation in the experimental animals. Diets with a calcium-phosphorus ration of Ca-1 to P-1.90 did not induce caries in the teeth, whether vitamin D was deficient or not.

On the subject of tooth deficiency and rickets, Eliot, Souther, Anderson,

* Read at a Joint Session of the Food and Nutrition and Child Hygiene Sections of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

and Arnin,[2] recently studied the teeth of 450 children in New Haven. Enamel hypoplasia of the permanent teeth formed during infancy and early childhood, characterized by symmetrical distribution of the defects, was observed to be "regularly associated with rickets." Dental caries also, occurred more often in the rachitic children, than in the non-rachitic. Suitable anti-rachitic therapy was found to reduce the incidence of enamel hypoplasia decidedly, and also, to some extent, the dental caries.

POSTURE

With regard to posture, we quote Park and Eliot: [3]

> In the active and moderate stages of rickets, the muscles are characteristically flabby and lax. In addition, the neuro-motor development of normal growth is impaired, if the rickets is severe. In the milder stages of rickets, however, the neuro-motor development may proceed uninterruptedly.

Lax muscles necessarily cause a slump in posture. This is a matter of common observation. Figure I shows a rachitic child in a typically lax posture. Figure II shows a child with good muscle tonus, in a normal posture.

The point is, that a healthy child naturally assumes a correct posture, whereas a rachitic child, because of lax muscle tonus and faulty bone development, often stamps himself as abnormal by his posture alone.

SUSCEPTIBILITY TO INFECTION

Animal experiment — The accumulated material on increased susceptibility to infection in rickets, is now impressive. Of the more recent contributions, one is cited.[4]

A strain of *Bact. coli communis* was used. It was found that a 2 hour daily exposure to mid-day sun for a period of 4 weeks, markedly raised the resistance of young rachitic rats to infec-

(*Hygeia*, Mar., 1935, p. 222)

FIGURE I—A rachitic child in typical lax posture

FIGURE II—A normal child with good muscle tonus in naturally assumed posture

tion with this organism. Of 263 sun-exposed rats, 57 per cent survived the inoculation, whereas of 241 controls not exposed, but 32 per cent survived the inoculation. Normal rats, however, were apparently not influenced by exposure to sunlight in their resistance to this infection. The author remarks that "apparently exposure to the sun does not increase the resistance of normal rats."

Brown and Tisdall[5] have reported a series of observations on the effect of a 2 hour daily exposure to sunshine upon rats inoculated with a special "low virulence" organism, previously isolated from albino rats. It was found that twice as many of the sunshine-exposed group survived intraperitoneal inoculation as did the control group, kept indoors away from sunshine.

Eichholz and Kreitmair[6] found that all of the rats fed diets deficient in vitamin D succumbed to an induced pneumococcic infection, whereas 50 per cent of the normal rats inoculated, resisted the infection, and eventually recovered.

Again, Grant, Bower and Stegermann,[7] experimenting with vitamin-deficient diets in pregnant rats, succeeded in infecting the offspring of mothers kept deficient in vitamin D during pregnancy with the tubercle bacillus, whereas normal rats are known to be quite resistant to this infection.

Human suceptibility—It has long been observed by pediatricians, that children with rickets, even of minor degree, are more than ordinarily subject to the common infections of childhood. The late Dr. Alfred S. Hess emphasized this point in a national radio address, under the auspices of the American Public Health Association, on September 27, 1933. He stated in part, "The most common nutritional disorder among infants in temperate zones is rickets . . . its chief danger is, that it lowers resistance to infection."

Mader and Eckhard, of the University Children's Clinic, Frankfort, Germany,[8] reported an investigation on more than 6,000 children, dealing with the relative incidence and fatality rates of 3 common infections of childhood, for the rachitic and non-rachitic groups. Whooping cough had an incidence of 46 per cent in the non-rachitic, and 54 per cent in rachitic children. The pneumonia incidence among the whooping cough cases was 29 per cent in the non-rachitic, and 37 per cent in the rachitic subjects, with equivalent fatality rates of about 46 per cent. In children with rachitic deformity of the chest, however, the pneumonia rate rose to 55 per cent, and the extremely high fatality rate of 81 per cent was recorded.

For measles, Mader and Eckhard report an approximately equivalent initial incidence in both rachitic and non-rachitic children, *viz.*, 50.6 per cent and 49.4 per cent, respectively, but the pneumonia incidence in the rachitic group was 34 per cent as against 24 per cent in the non-rachitic. Again, of those children having rachitic deformity of the chest, the rate of pneumonia was 58 per cent—more than twice as great—and of these, 75 per cent died—whereas the usual fatality from the pneumonia in measles was about 35 per cent.

Again, in diphtheria, Mader and Eckhard's comparison of the rachitic and non-rachitic cases developing bronchial stenosis, seems significant. Of the 454 non-rachitic cases of diphtheria included, but 15 per cent developed stenosis, whereas of 61 cases with rickets, 62 per cent, developed bronchial stenosis. The deaths for non-rachitic cases of diphtheria with stenosis were 35 per cent, and for the rachitic, 62 per cent, approximately twice as many. However, the small number of rachitic cases in this latter series leads us to regard the findings

as probably significant but not conclusive.

RELATIVE INCIDENCE OF RICKETS, COMPARED WITH THE COMMON INFECTIONS OF CHILDHOOD

For many years, there has been a lack of recognition of the extremely high incidence of rickets in the cities, compared with the other common ailments of childhood. Probably the reason for this lies in the different manner of reporting—rickets being commonly stated in percentages, based on specific surveys, and the infections being recorded in rates per 100,000 of population.

To appreciate the relative incidence of rickets and the infections, it is necessary to state them both in the same mathematical unit. Let us choose percentages for our comparison here.

Rickets in some degree, on the basis of recent surveys in American cities, is conceded to be present in at least 50 per cent of the urban child population under 2 years of age. As to the infections, the studies of S. D. Collins[9] on the incidence of the common communicable diseases are to be considered. The data of this study were compiled from personal histories of large groups of individuals at the given age groups, in various localities of the United States.

For the age group 1½ years, within which most of the rickets initially occurs, the following percentage incidences are given by Collins, for four of the common infections:

Measles	11.4%
Scarlet fever	.08%
Whooping cough	10.5%
Diphtheria	.6%

TABLE I

REPORTED CASES OF CERTAIN COMMUNICABLE DISEASES
CHILDREN UNDER TWO YEARS
1927–1934

Year	Measles				Scarlet Fever			
	Under 1 Year	1 to 2 Years	Total	* Per Cent	Under 1 Year	1 to 2 Years	Total	* Per Cent
1927	508	...	...	....	17	...	...	....
1928	97	302	810	1.62	20	407	424	0.85
1929	765	2,823	2,920	5.84	55	685	705	1.41
1930	54	156	921	1.84	141	675	730	1.46
1931	455	2,020	2,074	4.15	153	654	795	1.59
1932	207	1,364	1,819	3.64	29	508	661	1.32
1933	226	1,192	1,399	2.80	35	624	653	1.31
1934	...	1,158	1,384	2.77	...	612	647	1.29
Total			11,327				4,615	
Average				3.24				1.32

Year	Whooping Cough				Diphtheria			
	Under 1 Year	1 to 2 Years	Total	* Per Cent	Under 1 Year	1 to 2 Years	Total	* Per Cent
1927	548	...	...	....	65	...	...	....
1928	544	1,084	1,632	3.26	89	667	732	1.46
1929	366	808	1,352	2.70	84	674	763	1.53
1930	288	675	1,041	2.08	126	448	532	1.06
1931	472	1,100	1,388	2.78	70	359	485	0.97
1932	451	1,095	1,567	3.13	14	123	193	0.39
1933	234	555	1,006	2.01	2	14	28	0.06
1934	...	1,150	1,384	2.77	...	28	30	0.06
Total			9,370				2,763	
Average				2.68				0.79

* Estimated population 50,000 in each year up to 2 years or a total population of 350,000 for the 7 year period

Turning to another source of data on the prevalence of the infections, based on the reported cases in a large urban community, Table I, for Chicago, covering a 7 year period from 1927 to 1934, is of interest.

In Chicago, the average percentage incidences under 2 years, reported to the Board of Health for the four infections, were:

Measles	3.2%
Scarlet fever	1.3%
Whooping cough	2.7%
Diphtheria	.8%

The lower level of reported cases in Chicago, compared with Collins's data obtained by case histories, may be explainable on several grounds, such as unreported cases, a variable incidence in different localities, and the different time periods under investigation.

However, accepting for purposes of comparison the higher incidences reported by Collins, of which the maximum was 11.4 per cent for measles, it becomes obvious that the incidence of rickets is far higher than any of the common infections of childhood—at least in the cities. As such, it surely deserves the attention of the health officer, and especially in its contributory relation to the infections.

THE ANTI-RACHITIC AGENTS

What progress has been made with the several anti-rachitic agents recently advocated for the cure, prevention, and possible eradication of rickets? We must frankly admit that we do not know. One thing, however, is clear—that in sum total, the anti-rachitic agents are yielding definite results. The incidence of rickets is slowly but surely receding. Severe rickets is now seen only occasionally, even in the cities, and mild rickets, as an easily recognizable clinical entity, is also on the decline.

The latest of the generally applicable anti-rachitic agents is vitamin D milk, produced by three processes—irradiation, fortification, with a concentrate, and the feeding of irradiated yeast to cattle. Its potential usefulness toward solving the public health problem of rickets, cannot as yet be judged. However, Table II, based on the easily recognizable symptoms and marks of rickets in the preschool group of children in Chicago, examined routinely year by year in the infant welfare stations from 1926 to 1935, inclusive, shows a decided decrease in rickets. These figures cannot be regarded as representing the total incidence of rickets in the community, because of the cursory nature of the examinations and because the data include healed rickets, which does not in any sense indicate the initial incidence, since the

TABLE II

PRESCHOOL CHILDREN IN CHICAGO
SHOWING DEFINITE EVIDENCE OF CLINICAL RICKETS

		Rickets							
		Mild		Moderate		Marked		Total	
Year	Number of Persons Examined	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent
1926	1,069	89	8.3	92	8.6	4	0.4	185	17.3
1927	2,158	107	5.0	267	12.4	14	0.6	388	18.0
1928	1,669	126	7.5	211	12.6	16	1.0	353	21.1
1929	1,636	141	8.6	155	9.5	16	1.0	312	19.1
1930	1,958	145	7.4	106	5.4	53	2.7	304	15.5
1931	7,142	613	8.6	468	6.5	75	1.1	1,156	16.2
1932	3,165	402	12.7	168	5.3	7	0.2	577	18.2
1933	2,575	268	10.4	84	3.3	1	0.04	353	13.7
1934	2,363	170	7.2	90	3.8	3	0.1	263	11.1
1935	3,057	162	5.3	55	1.8	1	0.03	218	7.1

TABLE III

SALES OF VITAMIN D MILK COMPARED WITH TOTAL SALES OF MILK IN CHICAGO, FROM JUNE, 1934, TO JUNE, 1935

	Average Daily Sales per Month	*Average Daily Sales per Month—Vitamin D Milk*	*Per Cent Vitamin D Milk*
Fresh Milk	Gallons	Gallons	
June, 1934	321,154	17,750	5.5
Sept., 1934	319,588	19,674	6.1
Dec., 1934	297,803	16,059	5.4
March, 1935	296,814	20,477	6.9
June, 1935	293,765	17,681	6.0
Average daily sales for the 5 months	305,825	18,328	6.0
Estimated yearly sales	111,626,125	6,689,720	6.0
Evaporated Milk			
Estimated yearly consumption of evaporated milk	31,800,000	15,900,000	50.0
Total estimated yearly consumption of fresh and evaporated milk combined	143,426,125	22,589,720	15.7

milder forms heal without leaving any evidence.

The total amount of easily recognizable rickets found within the last year, in this preschool group of children, declined from 13.7 per cent in 1933 to 7.1 per cent in 1935. Mild rickets also dropped from 10.4 per cent in 1933 to 5.3 per cent in 1935, and moderate rickets from 3.5 per cent to 1.8 per cent. Severe clinical rickets apparently began to yield to earlier preventive measures, as far back as 1932, with an incidence of 0.2 per cent in the preschool children routinely examined. It is interesting to note that the item of severe rickets reached 0.03 in 1935.

Within the last year, the only anti-rachitic influence calculated to affect the child population generally in Chicago, is vitamin D milk (Table III), the sale of which was authorized by ordinance on April 24, 1934, and began immediately thereafter. The general sale of vitamin D evaporated milk in Chicago began at about the same time. Since then, the percentage of vitamin D fluid milk consumed in the city, as indicated by quarterly surveys, has remained constant at about 6 per cent of the total sales. In addition, there was consumed, according to the best estimates obtainable, about one-fourth to one-third as much evaporated milk, of which approximately 50 per cent was vitamin D milk. No other unusual factors likely to affect the prevalence of rickets were operative within the year, so far as we know.

SUMMARY

There has been tardy recognition of the relative public health importance of rickets among the common ailments of childhood.

Recent experimental evidence shows quite definitely that the public health importance of rickets lies principally in its contributory relation to the infections of childhood, such as measles, scarlet fever, whooping cough, and diphtheria.

Definite conclusions regarding the efficacy of the latest addition to the generally available anti-rachitic agents, vitamin D milk, are not yet possible. The time since its introduction is too short, and unfortunately the volume of fresh vitamin D milk consumed is still far too small to permit of satisfactory evaluation.

However, the combined consumption of fresh and evaporated vitamin D milk in Chicago, during the past year, amounting to about 25 per cent of the total sales of milk, when considered in

connection with the recently noted decrease in clinically recognizable rickets among the preschool children, is sufficiently suggestive to justify more general trial of this fortified food product, as an anti-ricket reagent.

When the total sales of both fluid and evaporated vitamin D milk reach about 50 per cent of the total sales of each, the real test of the product as a general anti-rachitic agent, will have begun.

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Charles Kingsley on the Laws of Health

IT was in 1879 that Charles Kingsley had recognised that the best knowledge of the time concerned the new light on the laws of health. "I am going," he writes, "to throw myself into this movement. I am tired of most things in the world; of sanitary reform I shall never grow tired. No one can accuse a man of being sentimental over it, or of doing too much of it. There can be no mistake about the saving of lives, and the training up of a healthy generation." Again he says, "I see more and more that we shall work no deliverance till we teach people a little more physical knowledge. I have refused this winter to lecture on anything but the laws of health." Since Kingsley's days there have been many changes, but not one which has impaired the truth of his writings. Let us, therefore, aim at increased efforts toward securing an enlightenment of the people in regard to the health of the community, for in this way we find the true source of health and happiness. —James Fenton, M.D. Public Lecture to the South African Health Congress, *J. Roy. San. Inst.*, May, 1936, pp. 646–647.

Effect of Relief Programs on Public Health Nursing in the State*

Preparation of Nurses

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THERE has been a Bureau of Public Health Nursing in the Indiana State Health Department ever since 1921, but we in the bureau have never had authority over any of the public health nurses employed locally as such bureaus have in states which subsidize nurses' salaries. Our first aim was to raise the standard of preparation of nurses who wished to do community health work, so we kept advising them to get prepared, showing them how and where they could get this preparation, and we kept advising organizations, both official and unofficial, to employ nurses who met the minimum qualifications outlined by the National Organization for Public Health Nursing.

These organizations or officials chose the nurses they pleased if they did not care to take our advice. Nurses thus employed used our daily and monthly report forms and sent us monthly reports—if they liked. We never could get uniformity. We had just reached the point where perhaps half the health officers, school men, and lay boards were beginning to realize that the right nurses with the proper preparation in public health could run rings around nurses employed solely because they were home town girls, or personal friends, or belonged to the right political party. We always dreamed though of what we could accomplish if we only had a little authority so that nurses would have to accept our leadership.

Then the Civil Works (later the Emergency Relief) Administration Program opened up the opportunity, indeed, the necessity, for us to educate and guide a large group of nurses on public health assignments. We quailed at the thought of putting totally unprepared nurses to work in the rural areas and small towns without local qualified public health nursing supervision, but here, partially at least, was a chance to fulfil our dreams, for these nurses were totally dependent on us for salaries, education, and supervision, for 18 months. We did not have time to philosophize over the effect these nurses would have on our standards of public health nursing in the state; we had to get busy.

You who read the *American Journal of Nursing* [1] and *Public Health Nursing* [2] are familiar with the details of our educational program for Indiana ERA nurses. I shall confine myself in

* Read before the Public Health Nursing Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

this paper to the significant lessons this experience taught us in guiding our future state-wide educational program for public health nurses.

A little professional house-cleaning and refurbishing had to be done before we could begin to prepare the ERA nurses for their community work. For years we had been working with lay boards, especially those of the unofficial health agencies, with groups of teachers, with the social agencies, and with the health officers, to teach them good standards of public health nursing; but we had almost ignored physicians, both individually and collectively. Now, partly as the result of the depression and the *Report of the Committee on the Costs of Medical Care,* we had been hearing vague rumblings from some of the physicians against public health nurses. These new nurses, we decided, must be taught at the start the unwritten laws of public health nursing ethics as they related to the medical profession. Likewise, we had to have the approval and coöperation of the physicians. This double task loomed biggest of all ahead.

The progressive superintendent of schools in one of our most populous counties sent in the first call for nurses—he wanted 6 to do township school nursing in areas that had never had the services of community nurses before. It was here that the rumblings against public health nurses among the medical men had been loudest. The assistant director of our bureau was sent to this county with the tacit understanding that she was not to come back until standing orders for the 6 nurses had been obtained from the local medical society. She did her work well. She convinced the reluctant superintendent of schools that his nurses needed these orders; then she assisted the medical society in formulating them. When completed, they included general directions for children found ill in schools, contained a list of conditions usually requiring exclusion of children from school, outlined what nurses should look for in inspecting school children, listed articles to be carried in the nurse's bag, outlined a simple program for the nurses to carry out, explained first aid procedures the nurse could use and the nursing care she could give in emergencies.

A copy of these regulations [3] found its way to the State Medical Association, where it created a great deal of interest and met with approval. There, mimeographed copies were made and sent to the secretary of every county medical society as a suggestion in case emergency nurses were put on to work in his community. Many copies were furnished our bureau and no new nurse was put on who did not have a copy to be altered or approved by her local medical society.

I have enlarged on the development of these regulations and standing orders because, as we look back, we realize that they were the first measures we designed to educate these new nurses. If the nurses lived up to the regulations we would not need to worry about their professional ethics. We found, too, that endorsement of the regulations by the State Medical Association oiled the wheels for our whole future program, for through them physicians all over the state, especially those who had never worked with public health nurses before, began to realize that community nurses were not trying to supplant them. To show their changed attitude, last winter the legislative committee of the State Medical Association put a clause in the full-time health officer bill giving public health nurses in Indiana a legal status for the first time in history.

Advisory nurses working by districts in the field were the next major measure we launched to educate the nurses. No program would have lasted without

them. All of them had too many counties and new nurses, but they did heroic work. They not only had to assist new ERA nurses in getting started, but no service was begun in a new community until they had made a visit there, seen the prospective nurses, helped to select the official sponsor, and made their recommendations to our bureau.

The 37 one-day institutes our bureau conducted in different sections of the state were an important factor in making for the efficiency of our new community nurses, and they had far-reaching effects in stimulating general nursing education in the state. However, it was the district advisory nurses—who attended each institute and assisted in conducting the program, and then taught the nurses in the field how to apply what they had learned at institutes to fit their individual situations—who made the education really carry over. We must never forget this fact.

ERA nurses on well organized public health nursing staffs were required to attend the institutes, even though they had the benefit of local staff education facilities. They and their supervisors contributed a great deal to the technical discussions and demonstrations. Most of them were doing bedside nursing. They learned a great deal too, because they got an insight into the complicated problems of county nurses who worked in rural or isolated areas, and who often had no hospital or social agencies in their territories to help them.

We learned that our bulletin *Echoes*, which has always been enjoyed by our regular public health nurses, was a potent factor in educating and stimulating ERA nurses and giving them a group feeling and pride. In it we put proposed plans, new rules and policies, announcements of institutes and meetings, news notes, extracts from narrative reports, and other educational matter. ERA nurses all read *Echoes* and solemnly took to heart all the suggestions it gave.

We learned that nurses can be stimulated to make narrative as well as statistical reports, which give a real picture of situations and problems and how they are met that is invaluable to a central bureau striving to help them. Edna L. Foley, R.N., of the Chicago Visiting Nurses' Association wrote us commenting on the case stories from ERA nurses which she read in *Echoes:* "I always feel that a narrative report is so much more interesting than a statistical one, but it is 50 times harder to wring from the nurses." We agree, but we found it could be done.

We could see a gradual improvement in the effectiveness of the ERA nurses' services as time went on. Their questions and responses in institute discussions, the advisory nurses' reports of their services, the nurses' own case stories given in their monthly narrative reports, showed that they were learning how to teach and organize; and many of them showed an uncanny understanding and practice of the art of public health nursing.

The whole demonstration changed our views somewhat about the preparation of new nurses for their jobs. We had thought that it would be calamity if a nurse took a public health position without a theoretical course or well guided experience, or both. Now we know she can do fairly acceptable work if trained right on the job, provided she is responsible to a central bureau well enough trained and staffed to give her education and supervision. We had thought too that nurses did better when working in communities away from their homes. Working at home did not seem to handicap Indiana ERA nurses.

I said early in this paper that we always dreamed of what our bureau could accomplish if we had a little

authority behind our leadership of public health nursing in the state, but we never dreamed that the results of such an opportunity would have such far-reaching effects, for a by-product of our institutes for ERA nurses was the creation of a desire among all nurses to know more about public health. They lead to state university extension classes in Principles of Public Health Nursing and Social Work for Nurses, which approximately 75 ERA nurses took last winter in several centers in the state; 65 institutional nurses also attended, and around 90 regularly employed public health nurses. Other well attended extension courses for nurses are being given in 7 centers of the state this year. Credits received apply toward the B.S. degree with a major in public health nursing. Many of the ERA nurses who are being employed to continue their programs with local official and unofficial funds took university summer courses approved by the N.O.P.H.N., and are continuing with their extension classes this winter. They are not through. They have had a taste of education in public health; they see their needs and opportunities.

The institutes and extension classes and general ERA nursing program led to the adoption by the State Board of Education in June of higher regulations for school nurses which were formulated by a special committee of the State Nurses' Association to advise the director of the Licensing Bureau, State Department of Public Instruction. The State Bureau of Public Health Nursing collects the professional histories of all nurses applying for school nurses' licenses and assists the Licensing Division in deciding what nurses are eligible for permits or licenses. To the Bureau of Public Health Nursing also falls the placement and supervision in the field of all school nurses.

The whole ERA nursing program led too to the better regulations and higher requirements for public health nurses employed by county commissioners and city councils which were formulated by the State Board of Health in July and made the responsibility of our bureau to administer and enforce.

In the past the standard of training of public health nurses employed by the unofficial health agencies has been somewhat higher than that of the nurses employed by the official health agencies. Now, however, with the new regulations, all officially employed public health nurses will have much higher standards.

I said that the main thing we learned from our ERA educational program was that in an emergency nurses in a state-wide program in public health can be trained pretty well on the job if a central agency like the Bureau of Public Health Nursing of the State Health Department has the trained personnel and the authority to do it through institutes and adequate supervision, supplemented by extension classes and summer courses. However, we still feel that regularly employed public health nurses should have the N.O.P.H.N. Minimum Qualifications [4] before taking their positions, and our new regulations for officially employed public health nurses require this. Initial preparation for public health nurses, though, is not enough. They must be constantly learning. We feel that one of the greatest tasks of our bureau in the future should be the arrangement of a continuous educational program for refreshing and stimulating public health nurses already employed, especially those without local supervision. Now that our bureau has more authority over the officially employed nurses we can plan such a program.

A recent survey made among rural and small town nurses in New York, Minnesota, Ontario, and Indiana by

a public health nursing student in Teachers College, Columbia University, showed they would welcome more supervision of the right kind, and felt the need of more assistance than they had been getting in organization work, program planning, community relationships, family case work, publicity, and records.

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The Sanitary Code

IN 1842 a report was published on the sanitary conditions of the labouring population of Great Britain. It was an elaborate description of the shockingly insanitary conditions under which the masses of the people were living in every part of the kingdom. The report pointed out that the formation of habits of cleanliness was obstructed by defective water supplies; that the actual loss of life from diseases induced by dirt and bad ventilation was greater than in any wars which the country had been engaged upon in recent times; and that the effect of the conditions upon the population was to make them short-lived, improvident, reckless and intemperate.

The first medical officer of health in England was appointed in 1847 for the City of Liverpool. London followed a few months later. The first Public Health Act was adopted in 1848 at a time when an epidemic of cholera was ravaging the country. In 1860 we were in the midst of a severe epidemic of typhus fever, and cholera again appeared. Further Acts of Parliament were introduced to deal with urgent problems, and public health legislation multiplied until in 1875 all the sanitary laws were consolidated in the great Public Health Act of 1875, which is the greatest sanitary code ever enacted in England or any other country. That Act has been the basis of public health legislation introduced in many quarters of the world; it has stood the test of time and is still on the statute book.—James Fenton, M.D., Public Lecture to the South African Health Congress, *J. Roy. San. Inst.*, May, 1936, p. 641.

Diagnosis of Infectious Mononucleosis in Public Health Laboratories*

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IN 1885 Filatow [1] presented a somewhat meager description of a glandular disorder of humans which he considered to be a disease entity. Four years later an accurate detailed description of similar cases was made by Pfeiffer [2] who recognized the condition as an infectious process characterized by very definite symptoms to which he gave the name "glandular fever." Before the close of the century this disease had been reported from all important medical centers throughout the world, the first case histories in this country having been published by West in 1896.

Because of its benign nature, perhaps, little attention was devoted to glandular fever until about 1918–1920 when several persons who had what was diagnosed as hopeless acute lymphatic leukemia recovered wholly in from 1 to 2 weeks. This so stimulated interest in glandular conditions in general that within a few years considerable literature on the subject had accumulated. Unfortunately, because of variations in symptoms and lack of historical knowledge, several names have been assigned to the same or similar conditions. Of these, 3 are in common usage at the present time: glandular fever, monocytic angina, and infectious mononucleosis. The last term appeared first in a report by Sprunt and Evans [3] in 1920, and has been more generally accepted in this country than abroad where "glandular fever" is more commonly used. Attempts have been made to apply these terms to what some contend are quite different infectious processes, namely: glandular fever, characterized by marked glandular enlargement usually in children from 5 to 15 years old; monocytic angina occurring in the 10–25 age group, characterized by a membrane in the throat clinically indistinguishable in appearance from diphtheria; and infectious mononucleosis, the febrile type occurring in adults, characterized by temperatures of 102° to 104° and maculo-papular eruptions frequently indistinguishable from those of typhoid fever, or rubelliform eruptions indistinguishable from rubella. No strict line of demarcation, however, exists between these conditions since occasionally all symptoms may occur in a single individual, and it is generally conceded that the different syndromes are but different manifestations of one and the same disease. From the standpoint of priority then, glandular fever is the proper appellation for this condition but "infectious mononucleosis"

* Read before the Laboratory Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

appears to us to be a more descriptive term.

The epidemic nature of infectious mononucleosis with an incubation period of from 5 to 15 days seems clearly established by the extensive reports of Tidy [4] and many others. Sporadic cases for the most part are more severe than the epidemic form, but in other respects the two forms are not significantly different. The degree of infectivity is not great though on occasions all members of a group may contract the disease, particularly when the group exposed is composed of children. Contact infection seems to occur only in the early stages of the disease and direct contact or throat droplet infection is probably the mode of transmission. Isolation of cases until 1 week after the temperature has returned to normal has been recommended.

The incidence varies considerably. Widely distributed epidemics, notably the 1930 epidemic in England, and large numbers of sporadic cases have been reported abroad. The number and extent of epidemics and the number of sporadic cases * in the United States are not great but it is believed that as more and more attention is given to this disease by public health authorities more cases will be found with a possible decrease in the incidence of those diseases for which infectious mononucleosis is commonly mistaken.

Infectious mononucleosis is usually encountered in the benign form though on occasion complete prostration with marked dehydration has been noted. Fatal cases are rarely reported unless there have been complications. Recurrence of the infection after several weeks is not uncommon, and recurrence after months and even years has been known. This may be taken as evidence that a single attack of the disease does not confer immunity. It should be pointed out that marked debility may be noted in some cases for from 6 months to a year following the onset of the disease.

The causative factor in infectious mononucleosis is still an open question. *Listerella monocytogenes* isolated from rabbits by Murray [5] and *Bacterium monocytogenes* isolated from an apparent case of the disease in man by Nyfeld [6] both lack confirmation as the etiological factor. A protozoön, noted by Bland [7, 8] who was able to produce a rapid and fatal febrile condition in rabbits and monkeys by the injection of blood from positive human cases of the disease, appears to be a normal inhabitant of many animals. Other organisms which at one time or another have been proposed as the infective agent all lack confirmation.

Whatever the cause or the course of the disease it is obvious that the clinician is dealing with an infectious and contagious disease, the importance of which lies not so much in the severity of the infection as in the confusing nature of the clinical symptoms. As previously pointed out, infectious mononucleosis in certain stages of the disease may be readily confused with typhoid fever, diphtheria, rubella, lymphatic leukemia, and less important conditions. An accurate laboratory diagnosis not only permits prompt reassurance of the patient by the physician but may save the public health officer considerable time and energy.

The blood picture in infectious mononucleosis, which is characterized by a more or less marked decrease in the polynucleated cells, with an accompanying absolute increase in the mononucleated cells, many of which are decidedly abnormal forms, offers a more satisfactory method of diagnosis than

* Working with a small group of physicians in Providence and Hartford since 1933 we have encountered to date 62 clinically, cytologically and serologically positive cases of infectious mononucleosis.

any one symptom. Even here, however, in some cases a marked "shift to the left" in the polynucleated cells with the appearance of the more primitive forms may be suggestive of myelogenous leukemia. On the other hand, since the absolute lymphocyte count often reaches a high level with the appearance of immature forms, particularly bi-nucleated cells, the picture may on occasion be almost indistinguishable from lymphatic leukemia. In view of the variations in both the clinical and cytological pictures a specific serological test would be of great value in diagnosis.

Paul and Bunnell,[9] in 1932, proposed a serological diagnostic test based on the presence of sheep heterophile antibodies in the blood of the patient. The heterophile antibody concerned may be defined as an antibody reacting with an agent other than and phylogenetically unrelated to the specific antigen responsible for the production of the antibody in question. The presence of increased sheep heterophile antibodies in the blood in cases of infectious mononucleosis was rapidly confirmed by a number of independent investigators. Furthermore, it was demonstrated that such antibodies were not increased in those diseases to which infectious mononucleosis so often bears a close resemblance.

The test originally devised by Paul and Bunnell and slightly modified by Stuart, *et al.*[10] consists of adding 0.5 ml. of 1 per cent suspension of washed sheep cells to 0.5 ml. of serial dilutions of the patient's serum. The tubes are incubated at 37° C. for 2 to 4 hours and the degree of agglutination noted. In the routine diagnosis of infectious mononucleosis it is not advisable to incubate the tests over night in the icebox since, as pointed out by Stuart, Tallman, and Brintzenhoff,[11] many normal sera with little or no sheep cell titer at 37° C. may show a titer as high as 1:160 when tested at 5° C. With confirmatory clinical and cytological evidence, a titer ranging from 1–80 to 1–10,000 at 37° C. is with few exceptions a positive diagnosis of this disease.

The test as described is wholly satisfactory as a diagnostic or confirmatory diagnostic test in a large majority of infectious mononucleosis cases, yet conditions do exist under which a serum of moderately high or even very high titer may be erroneously reported positive. Sheep heterophile antibodies similar in character to those found in infectious mononucleosis had been previously demonstrated by Davidsohn[12] and many others in the blood of individuals after injections of native or therapeutic horse serum, particularly when serum sickness developed. Moreover, it was shown by Davidsohn,[13] that such antibodies might persist in the blood of a patient for a year or more after treatment with horse serum. Should the serum from such an individual be submitted for an infectious mononucleosis test at any time previous to the disappearance of the sheep heterophile antibodies associated with the serum sickness, the routine procedure described would be valueless.

In an attempt to differentiate between the sheep agglutinating antibodies resulting from these two pathological conditions, Stuart, Welch, Cunningham, and Burgess[14] found that the sheep antibodies in serum sickness were completely adsorbed by emulsions of guinea pig kidney whereas those of infectious mononucleosis were not. In certain cases of serum sickness a gland condition resembling infectious mononucleosis is observed, but the blood picture does not resemble that of infectious mononucleosis. Should an apparent infectious mononucleosis case with a history of serum treatment give a high sheep cell titer, 1 ml. of a 1:5 dilution of the serum is adsorbed with 0.25 ml. of a

finely ground and washed emulsion of guinea pig kidney (Stuart[15]) for 1 hour at 37° C. with frequent stirrings. The mixture is then centrifuged and the supernatant fluid tested in serial dilutions for the presence of sheep cell agglutinins. If the sheep agglutinins are completely or almost completely removed by adsorption with guinea pig kidney, heterophile antibodies of the infectious mononucleosis type are not present. On the other hand, if the original sheep cell titer of the serum is not significantly reduced by the adsorption, the heterophile agglutinins of infectious mononucleosis are present.

Normal human serum possesses sheep heterophile agglutinins and, since the height to which the normal titer may rise has not been satisfactorily determined, it is sometimes difficult to tell whether one is dealing with a high titering normal serum or a low titering mild case of infectious mononucleosis, or a low titer from the early stages of an acute case of the disease. An accurate diagnosis is possible even under such conditions. Bailey and Raffell,[16] and working independently, Stuart, Fulton, Ash, and Gregory[17] noted that the heterophile antibodies of infectious mononucleosis were adsorbed by beef cells, and the latter investigators found that the sheep heterophile antibodies of normal sera were not removed by beef cells. One ml. of a 1:5 dilution of such a questionable serum is adsorbed with 0.25 ml. of washed packed beef cells as previously described for guinea pig kidney. The complete removal or the adsorption of a significant part of the sheep cell agglutinins is indicative of infectious mononucleosis.

The routine test for sheep agglutinins, confirmed if necessary by adsorption with guinea pig kidney or beef cells, will give an accurate confirmatory diagnostic test for infectious mononucleosis. It should be emphasized that the simple routine test is quite adequate for the great majority of cases and its simplicity will make it possible for practically all public health laboratories and most hospitals to carry it out routinely with their present equipment. The special adsorption tests are necessary on occasions and have been employed to excellent advantage in the laboratories of the Charles V. Chapin Hospital and the Rhode Island Hospital in Providence, and in the Bureau of Laboratories of the Connecticut State Department of Health in Hartford. We feel that the laboratory diagnosis of infectious mononucleosis will become increasingly important as a public health procedure as more cases are recognized through the use of a simple but accurate serological test.

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Tabulating Machinery for Indexing and General Tabulation in the Vital Statistics Office*

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TO most registrars in public health departments the adequate indexing of birth and death certificates is an irksome and prosaic task, falling into the category of "necessary evils." But it cannot be emphasized too often that records speedily recorded, accurately kept, and quickly available, are the very foundation of an efficiently conducted health department. As the city, state, and federal governments increase their demand for vital statistics as necessitated, for example, by the social security legislation passed by the last Congress, records become more and more important. Therefore, accurately kept, speedily recorded, and quickly available records, are the matters we propose to discuss.

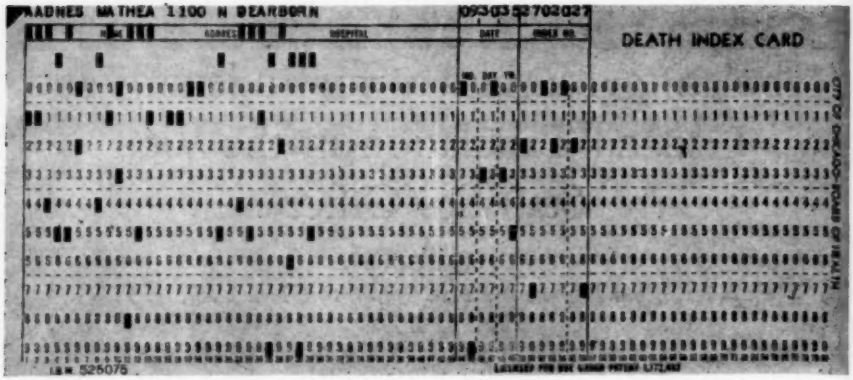
To provide a proper background for an appreciation of the new method of recording to be outlined in this paper, the usual handling of certificates, which has not changed materially for several decades, is worthy of summarization. While the details of the old procedure vary from place to place, the major steps are ordinarily somewhat as follows:

1. The incoming certificates are checked for accuracy and the certificates numbered.
2. Items on the certificates which are to be used as the basis for statistical tables are coded and, in most cases, tabulating cards are punched from this coded information.
3. Concurrently with many of these operations, there are usually prepared statistical tables of various types such as, in a city health department, a list of deaths or a daily analysis of general as well as infant mortality.
4. In most cases, index cards giving, in addition to the above information, some other identifying data such as residence, mother's maiden name, etc., are prepared.
5. Cities or states that maintain printed indices must, at the end of the year, make a copy of all the names in their files either by typewriting them or by spreading out the index cards and photographing them.
6. This copy is then given to the printer who, in turn, must set the information in type, proof-read it, and then return it to the health department to be checked as to its accuracy.

Due to the difficult composition, printing of matter of this sort is a lengthy task, as well as a costly one. Of course, while the index is being set in type—usually consuming a month or more—the index cards are not

* Read before the Vital Statistics Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 9, 1935.

FIGURE I—Index Card Made With Alphabetic Printing Punch



readily available for use in the office.

Where the old card system of indexing is used, card files soon become very voluminous, to the detriment of the working arrangement of the whole department. The element of human error is greater as the number of index cards in the file increases and, in the larger offices, a vast amount of valuable floor space must be set aside for filing cabinets.

The purpose of this paper is to describe a method which seems to overcome the shortcomings of the hand method and which can be installed without any appreciable amount of capital expense—a very vital factor in these days of meager appropriations and reduced budgets, coupled with the increased demands made upon the registrar's time and facilities.

It seems hardly necessary to elaborate on the punched card method as such. Tabulating machines employing the punched card principle have been used in health departments for almost 50 years, and most persons who received their training in public health work have some degree of familiarity with their operation.

The use of the alphabetic printing machines plays a prominent part in the subsequent description of the new indexing method. Based upon this new development in punched card equipment, the following procedure has been evolved which, with the necessary variations, can be applied to every indexing task:

1. Incoming certificates are checked for accuracy as heretofore. Inaccurate or incomplete certificates are, of course, held for correction or further information.

2. The correct certificates then go directly to the clerks who code and verify them in the usual manner.

3. Next, tabulating cards are punched for statistical purposes. An index card is now made on a machine which punches and simultaneously typewrites across the top of the card the same information shown in the punched card (see Figure I). This double process of punching and typing is made possible by the development of a new type of machine, called the duplicating printing punch, which combines the punching mechanisms with a standard typewriter keyboard and type (Figure II).

4. The accuracy of the punching is verified by the use of the key punch verifying machine. The cards are then filed by hand, daily, in an alphabetical file.

5. At the end of the year the cards are removed from the file and sorted into strict alphabetic sequence by the electric sorter at the rate of 12,000 cards per hour, thus assuring a strictly accurate list down to the last letter of the name.

6. The cards are then run through the alphabetical printing machine which, at the speed of 80 cards per minute, prints the en-

FIGURE II—Alphabetic Printing Punch

tire information contained on the card—that is, the name, address, date of birth or death, and certificate number—across the width of the paper with one imprint of the machine (Figure III). This printing machine has 88 type bars, 45 of which are capable of printing numeric information only, while 43 can print both numeric and alphabetical information. The type bars in this latter section have 36 characters, 26 for the letters of the alphabet and 10 for the numbers from 0 to 9. This arrangement assures great flexibility and absolute accuracy in the reproduction of names and addresses.

By operating the machine for 10 hours a day, it is obvious that a file involving several hundred thousand names can be completely listed in a very short time. By utilizing paper of the proper size, it is possible to prepare the book indices directly from these sheets by the photo-offset or planograph process. However, if desired, planographing can be dispensed with, as the tabulating machine can produce, by means of inter-leaved one-time carbons, as many as 7 or 8 copies with perfect legibility. Still another possibility is the use of a mimeographed stencil in lieu of paper in the printing mechanism of the tabulating machine. From this stencil, as many additional copies as are needed can be prepared inexpensively. Again, the use of a hectograph ribbon in the tabulating machine enables additional copies to be made on any gelatin duplicators.

By keeping the cards for a number of years it is, of course, entirely feasible to make a cumulative alphabetical index covering 2, 5, or even 10 years, thus enormously reducing the amount of file space and searching time required.

The flexibility of the punched card method makes it practical to have the entire indexing for the state carried on at one central location. Local registrars who would normally file and index their own certificates can now send such certificates direct to state headquarters and within 2 days receive punched and printed tabulating cards already sorted, which they can insert into their own files. At the end of the year, state headquarters, from a duplicate set in its possession, can give the city a printed index, upon receipt of which the detail cards may be destroyed. In states with many medium sized cities, which now maintain separate indexing files, the saving in time and money should be very great.

So far, our discussion has dealt with the use of modern alphabetical tabulating equipment in indexing. However, the same machines that do the indexing job so efficiently can also be of tremendous help in the preparation of statistical tables of all kinds. Tables showing a distribution of causes of death by age groups, sex, and color can easily be prepared. On the basis of punched card equipment now available in many public health departments, such a report requires anywhere from 7 or 8, to 20 separate runs through the card counting sorting machine. In every instance, the figures on the dials have to be read off and transcribed to a summary sheet. The transcription process is fraught with possibilities of error. The summary sheet, in turn,

must be given to the printer for typesetting and the proof must then be checked against the original—two more possibilities for error. The cost of typesetting statistical tables of this kind is high because linotype machines are not practical in this work. Finally, the time consumed is so great that in many instances there is a lapse of several years between the close of the period covered by the report and its actual publication.

Due to the fact that alphabetic listing machines, such as are used in the work previously described, can be furnished with 80 adding counters and with devices which permit the grouping of the data in almost any desired arrangement, running the punch cards through the machine will produce the printed forms in shape for immediate reproduction by photo-offset printing or planographing. As one of the sets of cards is usually maintained in "cause of death" order, no sorting will be necessary at all in such a case, and printed reports could be available in a matter of weeks rather than months or years. Again, by utilizing a mimeograph stencil in lieu of paper in the tabulating machine and by drawing in the dividing lines by means of a stylus, thousands of copies of a table may be made rapidly and very inexpensively.

As to the cost, it may be interesting to know that on the basis of studies made in several cities, notably New York and Chicago, the statement can be made with a reasonable degree of accuracy that photo-offset reproduction or planographing directly from reports prepared by the tabulating machines costs just about one-quarter as much as having the same reports set up in type and printed. This saving does not take into consideration the time required for having the health department check the printer's proof.

To sum up: we have attempted to show in this paper that, by the use of modern alphabetical tabulating equipment, the cost of indexing may be greatly reduced, and accuracy and efficiency of the office increased. We

FIGURE III—Section of a Death Index for a City Printed Directly from Punched Cards

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ABLIN NELL WALKER 2757 PINE GROVE                    11 18 34 33535 27
ABNEY BENJAMIN 4537 WABASH                           10 12 34 28644 27
ABNEY WALTER 2533 LOWELL                              7 25 34 20755 27
ABRAHAM CHARLES 827 SUNNYSIDE                         7  1 34 18624 27
ABRAHAM EMIL 944 NEWTON                               3 30 34  9243 27
ABRAHAM GOLDIE 1301 S KILDARE                        12 15 34 34106 27
ABRAHAM JOHN 1743 KEENON                              4 19 34 12458 27
ABRAHAMS CHILD OF HATTIE 215 E 58          SB         3  6 34   284 26
ABRAHAMS ABRAHAM 1745 E 55                            2  4 34  3539 27
ABRAHAMS MORRIS 3815 WILTON                           6 22 34 17635 27
ABRAHAMS RACHEL WAUKEGAN ILL               OT         2 15 34   546 26
ABRAHAMSEN KATE 5220 RACE                             4 29 34 12432 27
ABRAHAMSON AMELIA 1720 SUMMERDALE                     1  7 34   540 27
ABRAMOVICH PETER 6146 W 61                            7  7 34 19356 27
ABRAMOVITZ JACOB 918 MAXWELL                         12 28 34 35482 27
ABRAMOWICZ STANLEY 2345 N LOCKWOOD                    9  7 34 25014 27
ABRAMOWICZ TEKLA 8604 EBCANABA                        3  2 34  6126 27
ABRAMS FANNIE 906 GLENGYLE                           12  5 34 33101 27
ABRAMS FAY 6420 WAYNE                                 2 28 34  5846 27
ABRAMS HASKELL 8827 MUSKEGON                          6 16 34 17013 27
ABRAMS IKE 1334 HYDE PARK BLVD                       11 24 34 32111 27
ABRAMS MOLLIE 1321 S KILDARE                          5 19 34 14273 27
ABRAMS PAUL 5483 GREENWOOD                            5  1 34 12469 27
ABRAMS ROBERT 5612 INGLESIDE                          9 26 34 26755 27
ABRAMS SAM 2527 THOMAS                                1 23 34  2225 27
ABRHAM ANNA 3819 W 55 PL                             10 21 34 28841 27
ABROMAITIS STELLA 3432 LOWE                           1 15 34  1338 27
ABT LOUIS 4109 W MONROE                               4 14 34 10777 27
ACACIO BERNICE G KANSAS CITY MO            OT         5  1 34  1452 26
ACCADIO LEONARD 6613 OCONTO                          10 22 34 29018 27
ACCARDO VENCENZO 1004 S CYPRESS                      11  3 34 30032 27
ACCETTURA GAETANA HUNTINGTON PK CALIF      OT        11 23 34  3531 26
ACCORSI INFANT 2144 N 74TH CT ELMWOOD PK             10 17 34 28575 27
ACHESON ERMA 2515 W ADAMS                            10  2 34 26317 27
ACHTEN CHARLES 439 N HAMILTON                         3 16 34  7765 27
ACHTERBERG CHARLES OAK PARK                OT         6  2 34  1772 26
ACKELS ANNA 10616 S HOYNE                             9 20 34 26087 27
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believe that the machines that make this possible need not be confined to indexing, but that they may be applied with equally salutary results to the preparation of all manner of statistical tables and tabulations.

It should be noted that the size of the health department is not necessarily a factor in determining the applicability of the punched card method. Of late, tabulating service bureaus have been established in principal cities throughout the world, so that a department would need only a punch and a sorting machine of its own, delegating the task of preparing the printed index itself to such service bureaus. In this way, the fixed expense can be held down to a minimum without sacrificing any of the benefits of this method.

Twins

ONE out of every 100 women about to have a baby in New York City, will surprise her husband by presenting him with twins. One out of every 20,000 expectant fathers will be overcome by having to care for three new arrivals. Neither the expectant mother nor father, however, need have much fear of having to provide for quadruplets, for in the recent history of the Department of Health there have been only two sets of quads. These were born in the Bronx in 1934 and all died.

These facts were disclosed May 30 by a survey just completed by the Bureau of Records of the Health Department, New York, N. Y., covering the 14 year period, 1922 to 1935, inclusive. One of the tables is shown here.

Period	*Births, Yearly Average*	*Twin-sets, Yearly Average*
1922–1926	128,717	972
1927–1931	123,611	1,092
1932–1935	103,818	871

From this it may be seen that while births have shown an average yearly decrease of approximately 25,000 between the 1922–1926 and the 1932–1935 periods, the decrease in twins has only been an average of 101 sets a year. Twins, however, have been following the downward trend of births year by year, and this is particularly noticeable from 1928 to the close of last year. In 1928 there were 1,212 sets of twins born, while in the 3 following years, 1929, 1930, and 1931, the average was only slightly over 1,000 sets a year. Since then the 1,000 mark has not again been reached.—New York Dept. of Health Release, May 31, 1936.

Effect of the ERA Nursing Service on Volunteer and Official Agencies*

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FORTUNATELY the State Board of Health has had the full control of the ERA Nursing Service. This has prevented duplication of work. One can readily see the possibility of friction and the lack of coöperation if it had not been under proper supervision.

Due to lack of funds for the past 3 years, the Division of Public Health Nursing has not been conducting a generalized program and supervising the nurses employed by volunteer agencies and by cities and counties; therefore, has not received monthly reports from these nurses employed by the local organizations. Prior to the establishment of the ERA Nursing Service the list of those employed in the state was incorrect and incomplete. A survey was made to determine the number of organizations employing nurses. As a result of this survey, it was found that a total of 91 nurses were employed in the state by:

4	Red Cross
1	U. S. Naval Air Service
5	Full-time in County Health Departments
7	Metropolitan
4	Crippled Children's Commission, financed by the American Legion
2	Junior League and Kiwanis Club
1	Tuberculosis Association
59	Cities, counties, and school boards
1	Gulf Life Insurance Company
7	Industrial

It is a pleasure to speak of the relationship between the state ERA Nursing Service and the city, county, and volunteer organizations. In Florida we have so few full-time health departments and so few one nurse services, it hardly seems fair for us to compare the ERA Nursing Service with that of other states where the ERA nurses can work under the supervision of a trained health officer. Furthermore, time has not allowed us to judge the effect of the ERA Nursing Program on the permanent services. Because of our knowledge of the work in the state there has been no overlapping or interference in any way with the volunteer or official agencies, but the ERA has filled a definite need which for lack of funds or perhaps because sufficient influence had not been brought to bear on appropriating officials, had not been met by the permanent services.

If under the proper supervision, there is no reason for any organization to look at the ERA Nursing Service with fear and trembling—wondering how it will function and whether it will disrupt and antagonize the agencies with which the lone nurse as well as the units have established satisfactory relations.

Recently when the program had to be cut, it was interesting to note the requests from the various counties pleading for their nurse to remain. Again, when the program had to be changed from FERA to WPA, several of the counties appropriated funds or transportation so that the project could be passed. In the counties where there

* Read before the Public Health Nursing Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 8, 1935.

is no permanent organization the ERA Nursing Service had developed a health consciousness and assisted in promoting health units, which we hope will materialize when Security Funds are available.

Where advisable, nurses were assigned to health departments, but were visited weekly by the District Supervisor of Nurses, who was well trained in public health, so that the State Board of Health would be in constant touch with the work. The nursing services in 2 of the large city health departments were utilized to give training and experience to the ERA nurses. After this training each nurse was placed by herself in a district dividing the territory with the nurse previously employed by local agencies. In a community where a public health nurse was already employed and it was not practical to divide the territory, the ERA nurse confined her activities entirely to ERA clients carrying on a generalized public health nursing service with the family. With 3 organizations in Duval County—City Health Department, Metropolitan Life Insurance Company, and Gulf Life Insurance Company—all employing nurses, one can readily see the duplication if a plan had not been worked out and frequent conferences held with the supervisors of each service.

Monthly meetings were held with all public health nurses, and while their primary purpose was to discuss articles in various professional magazines and the newer methods in public health, they gave all an opportunity of becoming acquainted, which made for a better understanding of the work.

During the past few years the public health nurses have for the most part confined their efforts to school work, to the neglect of the prenatal, infant, preschool, and classes in home hygiene and care of the sick. Where we found this to be the case, the ERA nurse carried on a more intensive maternity program, and conducted home hygiene classes. The classes have been or will be conducted in practically every county in the state, affording a means of teaching the parents the care of the sick in the home and how to meet simple emergencies, thus decreasing the number of necessary home calls for the nurses.

Not until this service was developed, did the public health department give any bedside nursing, which even now is given for the purpose of demonstration only.

There was no Visiting Nurse Association in the state. For the most part practising physicians and health officers were unfamiliar with this type of work, and the health department did not consider it part of its program, but with the sympathetic understanding of our state health officer toward the nursing service, we were able to give the public a service never before rendered in Florida. As a result, one permanent Visiting Nurse Association has been organized and is ready to function when ERA is discontinued.

To build for the permanency of the nursing program, public health nursing councils of lay people have been organized. In counties where there was an active Red Cross committee or tuberculosis committee, having no special project, they were asked to sponsor the nursing service. In many instances this has been carried out and developed a stronger organization than had existed in the past. The Loan Closets, which have been established in the majority of the counties, have been developed by these public health councils, and articles have been supplied by various organizations. The community has found that this fills a great need among the poor patients and is a source of satisfaction. Where public health councils had been established prior to the ERA service, we have asked if the

nurses could attend the monthly meetings and submit reports just as the permanent nurses did. This was done for 2 reasons—so the people in the community could see there was no duplication of work and so the permanent nurse could hear the report of the ERA nurses, at which time a conference would be held in regard to the work of both services. They have proved very helpful both to the ERA and permanent nurses and have enhanced the value of their work.

Few medical advisory committees had been organized in the state, probably due to the fact that the doctors had taken for granted the work of the nurses, and the nurses had failed to ask for the appointment of advisory committees; but because the majority of the ERA nurses were unfamiliar with public health nursing and a certain amount of bedside nursing would be given, the presidents of the local medical societies were requested to appoint these committees and approve standing orders, which were drafted somewhat after those of the N.O.P.H.N., but modified to suit the local situation.

Monthly small district institutes were held by the district supervisors for the purpose of familiarizing the ERA nurses with the work. The permanent nurses contributed to the institute programs giving demonstrations and discussing various phases of public health nursing. Larger district institutes were conducted by representatives from national organizations which both permanent and ERA nurses attended.

Our main object was to coöperate with all existing agencies and serve the people to the best of our ability. Several separate nursing projects were proposed, but fortunately, through our state health officer, they were directed along the proper lines and kept under the supervision of the State Board of Health. The ERA Nursing Service under the State Board of Health has served well the purpose for which it was established, namely, to give employment to nurses in need, and give bedside nursing to relief clients; furthermore, it has supplemented in a large way the public health nursing programs of the State Board of Health and other agencies.

Without additional personnel, the permanent organizations would have been unable to give proper nursing supervision to the many ERA projects that were promoted, such as nursery schools, canning factories, mattress factories, etc., all of which needed public health attention.

Because of their previous training and experience the regular staff nurses were made supervisors and it became their duty to instruct the ERA nurses in the proper procedure of conducting a generalized program, which included the supervision of midwives.

We should look upon all public health nurses, both permanent and ERA, as members of one happy family, all working toward the same goal.

Tuberculosis Studies in Tennessee*

A Clinic Study With Reference to Epidemiology Within the Family

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PAPERS have appeared from the Tennessee Department of Public Health which bear the general title, "Tuberculosis Studies in Tennessee."[1] This is another of the same series and deals with certain findings in the study of a group of white individuals forming a number of household groups in Williamson County, Tenn.

Williamson County had a population of 22,845 according to the Federal Census of 1930. Of this number about 23 per cent were Negroes. The county is usually considered representative of the rural part of the section known as Middle Tennessee. It has 1 incorporated town, Franklin, which had a population of 3,377 in 1930.

The chief source of income is agriculture, as there are no large industrial concerns in the county. An active and efficient full-time county health department has been in operation since 1921. The intensive study of tuberculosis was begun shortly before 1932, and was made possible through the coöperation of the International Health Division of the Rockefeller Foundation. During the preceding 12 years the number of deaths reported as due to tuberculosis averaged 29 per year, an average annual tuberculosis death rate of 123 per 100,000 population. This rate does not differ materially from that of the state as a whole, and the same trends downward have been seen in Williamson County and in the State of Tennessee.

The group engaged in the study of tuberculosis in the county has endeavored to locate as many cases as possible, and to examine those individuals who are or have been in close association with the cases found. The follow-up activities have been a matter of much importance, and an ever-growing one with the finding of additional new cases with the progress of the study. One of the objectives has been to assemble material which might be useful in planning and conducting programs for the control of tuberculosis in other rural areas.

There are 150 households included in the material used in the present study. Each has or has had in residence a person known, or suspected, to have some form of pulmonary tuberculosis of the adult type. Each of these individuals is the "index case" in the household in which he is recorded. The "index case," as used here, designates that person through whom attention was drawn to the household, and may not

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* Read at a Joint Session of the Epidemiology and Public Health Nursing Sections of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 9, 1935.

be the only case in the household, or the initial case in the household in point of time. The index case may not be tuberculous, having been examined because of suspected tuberculosis and found to be negative, so far as any demonstrable pulmonary lesion of the adult type is concerned. Although the numbers involved are small, they are statistically significant.

The index cases furnish a group which may be considered a cross-section of those found in carrying on a case-finding program based on obtaining information concerning known or suspected cases of tuberculosis. Such a program is in effect in many parts of the country at present. A matter of particular interest is the result of examination of household contacts of various types of index cases in order to determine which are: (1) infected with the tubercle bacillus, and (2) additional cases of tuberculosis.

The index cases are classified in 4 types:

1. Fatal plus sputum positive—In this group are included those which resulted fatally before the observation of the household, and those which were found to have positive sputum within 1 month of the initial clinic examination.

2. Manifest tuberculosis, sputum negative, or unknown—Those with clinical symptoms and X-ray findings which do not have the appearance of being in an arrested stage, sputum examinations negative, or no sputum available at the time of initial clinic examination.

3. Manifest tuberculosis, arrested—Those with no clinical symptoms suggestive of activity at the time of examination, and with X-ray findings having the appearance of being in an arrested stage.

4. Negative—Those which have no evidence on physical or X-ray examination of any pulmonary tuberculosis of the adult type.

The 150 index cases referred to fall into this classification as shown in Table I. A few in the series have been omitted. Index cases with latent apical tuberculosis and the households in which their records appear were omitted because the numbers were too small to be of statistical significance; those classed as suspicious have been excluded as the diagnosis was regarded as incomplete.

Table I shows the numbers of households in which the various types of index cases were found, the numbers of other members of these households and the numbers of these other members of the households which were examined, and the average number of members of the households.

It is seen that the percentage examined varies somewhat with the severity of the type of index case. It appears that it is possible to examine a larger percentage of the contacts of the more severe types than of contacts with one which has been found negative. This would be expected, but there has been no conscious difference in the effort made to secure the examinations.

TABLE I

CLASSIFICATION OF INDEX CASES, WITH MEMBERS AND EXAMINED MEMBERS OF HOUSEHOLDS

Type of Index Case	*Number of Households*	*Members of Households (Excluding Index Cases)*	*Members Examined*		*Average Number of Members of Households*
			No.	*Per Cent of Members*	
Fatal plus sputum pos.	34	148	127	86	5.4
Mfst., sputum neg. or unk.	34	143	118	83	5.2
Mfst., arrested	34	138	96	70	5.1
Negative	48	243	154	63	6.1
Total	150	672	495	74	5.5

TABLE II

RESULTS OF TUBERCULIN TESTING OF HOUSEHOLD CONTACTS BY TYPE OF INDEX CASE, AND DOSAGE OF TUBERCULIN

Tuberculin Reaction	Fatal Plus Sputum Pos.		Mfst., Sputum Neg. or Unk.		Manifest Arrested		Negative	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Pos. to 0.01 mg.	84	80	56	53	26	39	49	37
Pos. to 1.0 mg.	6	6	23	22	19	28	26	19
Neg. to 1.0 mg.	15	14	27	25	22	33	59	44
Total	105	100	106	100	67	100	134	100

The average number of individuals comprising the household of a negative case is somewhat larger than in the other groups.

Table II shows the results of tuberculin testing of individuals in household contact with 4 types of index cases, arranged according to the dosage of tuberculin necessary to produce a reaction. Two dosages were used, 0.01 mg. and 1.0 mg. of old tuberculin, the larger dosage being used only after the smaller had not produced a reaction. The tuberculin was of a lot standardized by the method of Aronson and his coworkers of the Phipps Institute for the Study, Treatment, and Prevention of Tuberculosis.

It can be seen that the percentage of positive reactors decreases with the decrease in severity of contact as indicated by the type of index case in the household; also that the percentage of positive reactors to 0.01 mg. of tuberculin decreases in a like manner. This would indicate that a state of allergy exists in a greater proportion of contacts with the more severe type of index case, and that smaller dosages of tuberculin are necessary to show that this state of allergy exists.

Table III shows the age distribution of individuals tuberculin tested in household contacts of index cases.

It may be seen that 70 per cent of these household contacts reacted to

TABLE III

AGE DISTRIBUTION OF INDIVIDUALS TUBERCULIN TESTED IN HOUSEHOLD CONTACT WITH INDEX CASES

Age Group Years	Total	Tuberculin Positive						Tuberculin Negative	
		0.01 Mg.		1.0 Mg.		0.01 Mg. or 1.0 Mg.		1.0 Mg.	
		No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
0- 4	57	24	42	1	2	25	44	32	56
5- 9	78	23	29	16	21	39	50	39	50
10–14	76	29	38	18	24	47	62	29	38
15–19	61	31	51	19	31	50	82	11	18
20–24	26	19	73	4	15	23	88	3	12
25–34	33	27	82	4	12	31	94	2	6
35–44	36	25	69	6	17	31	86	5	14
45–54	20	17	85	3	15	20	100	..	..
55–64	17	15	88	2	12	17	100	..	..
65 +	8	5	62	1	13	6	75	2	25
Total	412	215	52	74	18	289	70	123	30

tuberculin in dosages of 1.0 mg. or less. Of the 412, 52 per cent reacted to 0.01 mg. An additional 18 per cent reacted when 1.0 mg. was used. The percentage of positive reactors to the 2 dosages after early life is approximately parallel, *i.e.*, the use of the larger dosage of tuberculin produces about the same percentage of reactors among those negative to the smaller doses in each age group after the 15–19 year group. In the age group under 5 years, practically all the reactions were to 0.01 mg. In the 35–44 year age group there is a drop in the percentage of positive reactors, which is probably of no significance. In persons 65 and over, there is a greater drop in the percentage of positive reactors, but this group is too small to be of significance. The index cases are not included in this tabulation.

It is quite apparent that there must be differing degrees of exposure within the household, and also varying possibilities of contact with tuberculous individuals outside the household. If individuals under 25 years of age are considered, and divided into 3 age groups, under 5, 5 to 14, and 15 to 24, it would seem reasonable to assume that in the younger age groups, household contact would be of more importance. Using these 3 age groups and the 4 types of index cases, with the result of tuberculin testing as an indicator of infection, Table IV was prepared.

It is seen that the percentage of household contacts under 25 years of age showing positive tuberculin reactions decreases with decreasing severity of the type of index case. These percentages positive are 79, 67, 61, and 47. The gradation downward is most marked in the age group under 5 years, individuals of which have a more circumscribed sphere of activity, largely limited to their own particular households. It is also reasonable to assume that if a severe type of index case exists in the household, the children under 5 years are in more intimate association with it than those in the next age group, 5 to 14 years. In Table IV it is seen that a lower percentage with positive tuberculin reactions is found in the 5 to 14 year age groups (roughly, the school age) than in the infant and preschool age group, under 5 years of age in the fatal plus sputum positive households. This difference is not statistically significant, as only a small number of individuals are included.

The results of clinical and X-ray examination of these household contacts differ from those shown by the tuberculin reaction. It is known that it may require a relatively long period before tuberculous infection can be demonstrated by an X-ray film of the

TABLE IV

TUBERCULIN REACTORS IN HOUSEHOLD CONTACTS OF 4 TYPES OF INDEX CASE IN 3 AGE GROUPS UNDER 25 YEARS OF AGE

Age Groups Years	*Fatal Plus Sputum Positive*			*Manifest Sputum Negative or Unknown*			*Manifest, Arrested*			*Negative*		
	Total	*Pos.*	*Per Cent*	*Total*	*Pos.*	*Per Cent*	*Total*	*Pos.*	*Per Cent*	*Total*	*Pos.*	*Per Cent*
Under 5	13	11	85	15	7	47	6	2	33	23	5	22
5–14	35	25	71	36	22	61	24	13	54	59	26	44
15–24	19	17	89	30	25	83	19	15	79	19	16	84
Under 25	67	53	79	81	54	67	49	30	61	101	47	47

TABLE V

CLINICAL AND X-RAY FINDINGS IN HOUSEHOLD CONTACTS BY TYPE OF INDEX CASE AND TYPE OF LESION

	Fatal Plus Sputum Pos.		*Mfst., Sputum Neg. or Unk.*		*Manifest, Arrested*		*Negative*	
Type of Lesion	*No.*	*Per Cent*	*No.*	*Per Cent*	*No.*	*Per Cent*	*No.*	*Per Cent*
Manifest tuberculosis	7	6	2	2	3	3	1	1
Manifest tuberculosis arrested	6	5	1	1	3	3	3	2
Latent apical tuberculosis	8	7	7	6	5	5	4	3
Latent infiltration and/or caseous lymph nodes, childhood type	10	8	6	5	..	..	2	2
Calcified nodules and/or tracheo-bronchial calcification	45	38	33	30	36	40	49	37
Negative	44	37	62	56	44	48	72	55
Total	120	101	111	100	91	99	131	100

chest; whereas, the tuberculin test is positive within a short time after infection. After the appearance of lesions demonstrable by X-ray films, they, for the most part, remain visible, while allergy may be lost over a time if the lesion has healed and reinfection has not taken place. Table V shows the findings on roentgenological examination of individuals in household contact with 4 types of index cases, arranged so that the cases of manifest tuberculosis are separated from the others.

The percentage of contacts showing evidence of manifest or latent apical tuberculosis is highest in the contacts of the most severe type of index case, and lowest in the contacts of those classed as negative, and the same is true when consideration is given to the more severe forms of childhood type of tuberculosis. All ages are considered here with no distinction as to younger age groups in which it might be reasonable to suppose that household contact would be of more importance than in the older age groups.

The age distribution of individuals with clinical and X-ray findings are shown in Table VI. These individuals are in contact with the index cases, and have been separated into groups according to clinical and X-ray findings.

The percentage of those in the mani-

TABLE VI

DISTRIBUTION OF INDIVIDUALS WITH CLINICAL AND X-RAY FINDINGS IN HOUSEHOLD CONTACTS OF INDEX CASES BY BROAD AGE GROUPS

	Under 15		*15–45*		*45 and Over*		*Total*	
Type of Lesion	*No.*	*Per Cent*	*No.*	*Per Cent*	*No.*	*Per Cent*	*No.*	*Per Cent*
Manifest tuberculosis	2	1	6	3	5	7	13	3
Manifest tuberculosis arrested	..	..	3	2	10	14	13	3
Latent apical tuberculosis	..	..	11	6	13	18	24	5
Latent infiltration and/or caseous lymph nodes, childhood type	18	9	..	..	..	..	18	4
Calcified nodules and/or tracheo-bronchial calcification	67	35	82	43	14	20	163	36
Negative	107	55	86	45	29	41	222	49
Total	194	100	188	99	71	100	453	100

fest, manifest arrested, and latent apical tuberculosis groups increases with age. As would be expected, all the more serious forms of childhood type of tuberculosis are found in the early age groups. Fifty-one per cent of these contacts show evidence of infection; 11 per cent show evidence of manifest or latent apical tuberculosis. With increasing age a greater proportion of these individuals show evidence of manifest or latent apical tuberculosis.

In order to gain more complete information as to the number infected with tuberculosis within any population group, it is necessary to consider results of roentgenological examination in addition to the results of tuberculin testing. It is quite possible for an individual to have a negative tuberculin test, using the generally accepted dosages, and show on X-ray unmistakable evidence of infection, if we accept the appearance of a calcified lesion as evidence. In Table VII the age distribution of individuals tuberculin tested is shown, with further subdivision by X-ray findings of those tuberculin negative. The individuals included are those in contact with the index cases.

The percentage of positive tuberculin reactors rises with increasing age with the exception of a drop in the age group 35 to 44. In the next 2 succeeding age groups the percentage positive to tuberculin is 100, with a drop in the group over 65 years. When the percentages of those negative to 1.0 mg. of tuberculin, but with positive X-ray findings (9 per cent of the total number of individuals) are added to the preceding group, the total percentage of the 2 groups reaches 100 in the 35–44 year age group, and remains at that level. In 21 individuals, 5 per cent of the total, and chiefly in the young age groups, either no X-ray films were obtained, or interpretations of the films were not possible. If those with negative tuberculin and satisfactory X-ray films are considered, there is a total of 102 individuals tuberculin negative, 39 of whom, or 38 per cent, showed evidence of infection on the X-ray film.

It is of some interest to separate the household contacts by the type of index case, and make sub-division of these contacts by the combination of results of tuberculin testing and clinical and X-ray examination. This combination shows in each group those contacts

TABLE VII

AGE DISTRIBUTION OF INDIVIDUALS IN HOUSEHOLD CONTACT WITH INDEX CASES, TUBERCULIN TESTED, WITH THOSE NEGATIVE SUB-DIVIDED BY X-RAY FINDINGS

Age Group Years	Total	Tuberculin Positive		Tuberculin Negative to 1.0 Mg.					
				X-ray Positive		X-ray Negative		Not X-rayed	
		No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
0– 4	57	25	44	2	4	16	28	14	25
5– 9	78	39	50	10	13	25	32	4	5
10–14	76	47	62	13	17	14	18	2	3
15–19	61	50	82	5	8	5	8	1	2
20–24	26	23	88	2	8	1	4	..	..
25–34	33	31	94	..	..	2	6	..	..
35–44	36	31	86	5	14	..	..	..	..
45–54	20	20	100	..	..	..	..	..	..
55–64	17	17	100	..	..	..	..	..	..
65 +	8	6	75	2	25	..	..	..	..
Total	412	289	70	39	9	63	15	21	5

positive to tuberculin and clinical and X-ray examination, those negative to both, and those positive to one and negative to the other. This arrangement is shown in Table VIII.

TABLE VIII

RESULTS OF TUBERCULIN TESTING AND CLINIC EXAMINATIONS IN HOUSEHOLD CONTACTS OF INDEX CASES, CLASSIFIED AS POSITIVE OR NEGATIVE

	Fatal Plus Sputum Pos.		*Mfst., Sputum Neg. or Unk.*		*Manifest, Arrested*		*Negative*	
	No.	*Per Cent*	*No.*	*Per Cent*	*No.*	*Per Cent*	*No.*	*Per Cent*
Positive Tuberculin Positive Clinic Findings	59	60	34	34	23	37	28	25
Positive Tuberculin Negative Clinic Findings	25	26	43	43	19	31	39	35
Negative Tuberculin Positive Clinic Findings	4	4	8	8	8	13	19	17
Negative Tuberculin Negative Clinic Findings	10	10	16	16	12	19	25	23
Total	98	100	101	101	62	100	111	100

The percentage of individuals showing positive tuberculin and positive clinical findings is highest in that group in contact with the index cases which have been fatal or sputum positive, and lowest in that in contact with the index cases classed as negative. The percentage of individuals with negative tuberculin and no clinical findings increases with decreasing severity of the type of index case. The percentage of individuals with negative tuberculin tests and positive clinical findings also increases with decreasing severity of the type of index case. The numbers in the various groups are small so that differences may not be significant, but it is believed that they are indicative of what may be found with a greater experience.

An attempt has been made to assemble material which would be comparable to data collected in other areas where the case finding methods are similar to those in Tennessee. It seems necessary in most areas to plan definitely this program of case finding and follow-up in families in which cases of tuberculosis are found. The time and personnel necessary for completion in all the details of a comprehensive program are all too limited. It may be possible to modify the program by some such division of cases as has been used in this analysis.

It would seem highly desirable to examine contacts of fatal cases as promptly as possible. A close check should be kept on those individuals in contact with positive sputum cases. If it is not possible to follow up all cases and their contacts, certainly this group and their contacts should be given first preference, and usually concentration of effort is needed.

The cases classed as negative index cases should require very little follow-up. A rather complete history concerning the other members of the household will almost always serve to direct attention to any others in the household group who might have significant findings on examination.

Next in importance to the first group mentioned would appear to be the group designated here as manifest tuberculosis, sputum negative, or unknown. Sputum examinations are of value in this group, as it is of impor-

tance to know as definitely as possible the number and place of residence of all sputum positive cases within any given health jurisdiction. It is from this group that many individuals later show positive sputum. The severity of this type of case seems to be somewhat less so far as infection of contacts is concerned, and reëxamination and intensive follow-up activity of case and contacts should be guided to a great extent by the result of sputum examinations. In Williamson County, the number of sputum examinations, and the time interval, are dependent on the recommendation of the clinician. Usually, from 6 to 10 sputum examinations are requested within 1 to 2 weeks, followed by examination twice each month, and with the occurrence of any increase in severity of symptoms.

In the handling of cases designated as manifest arrested, it would seem advantageous to space visitation so that the occurrence of any symptoms of activity could be rather promptly reported and reëxamination arranged.

If, in the course of getting a history of the other members of the households, there are definite indications for examination of any of the other members of the household groups, this should be made, and the classification of the household changed, should more severe types of the disease be found. With very few exceptions, however, the index case represents the most severe type in the household.

A plan of operation of the kind outlined is in use in Williamson County at present with satisfactory results. The time of the nurses is spent to better advantage; it is possible to keep adequate check on the household groups; a larger case load can be carried; and more time is available for the location of new cases. The necessary reëxaminations can be so spaced as to cut down somewhat on the time and money usually spent on this particular phase of the program.

SUMMARY

1. The results of examination of household contacts of 4 types of index cases have been presented.

2. The group of contacts in households with a more severe type of index case is infected in a larger proportion, and the presence of an allergic condition is more readily demonstrable.

3. This group of contacts shows a higher proportion with the adult type of tuberculosis.

4. The effect of household contact is more demonstrable in the younger age groups.

5. Tuberculin testing of contacts does not identify all individuals who have been infected.

6. It is possible to plan a program of case finding and follow-up, taking into consideration the type of index case in a household, so that more can be accomplished with the same expenditure of time.

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The Trained Public Health Engineer in Public Health Departments*

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IT is the frank purpose of this paper to discuss the rôle of the public health or sanitary engineer in public health departments—state, county, district or unit, and municipal—in the United States and to demonstrate the specific value of his services.

Information has been gathered and statistics are presented which show to what extent trained engineers are now employed in various types of health departments. The potential field of opportunity is exhibited and discussed on the basis of county and city populations and the general densities of population development.

Nearly three and a half decades ago Professor William T. Sedgwick [1] defined public hygiene as "the science and art of the conservation and promotion of the public health." He further stated: "It has for its function the prevention of premature death and the promotion of normal life, health, and happiness in communities chiefly by the elimination or amelioration of unfavorable environmental conditions common to many persons or communities either at one time or at different times." Sedgwick's classical statement needs but little revision to reflect completely the present-day attitude toward the true function of sanitation.

In the new edition of Sedgwick's work, prepared by Prescott and Horwood,[2] sanitation is defined as:

> . . . the science and art of the conservation and promotion of the public health through the control of the environment. It has for its object the promotion of health, comfort, and convenience of communities. Accordingly, it deals with those health problems that are common to groups or communities, such as water supplies, sewerage and drainage, refuse collection and disposal, milk supplies, food supplies, restaurant and food store sanitation, ice supplies, air conditioning, lighting, school sanitation, roadside sanitation, sanitation of swimming pools, sanitary drinking facilities, street cleaning, parks and playgrounds, and the control of insects, rodents, odors, noises, obnoxious gases, and other nuisances and dangers to health.

It is of course obvious that the control of man's environment, whether it be in densely populated communities or in sparsely settled rural areas, in so far as such control reduces preventable disease, conserves life, or makes living safer and happier, is a public health enterprise, interpreted broadly, and is therefore a function of any appropriate public health agency.

Reflection perhaps, and experience assuredly, will indicate that in its physical aspects the control of the environment is largely an engineering matter; that is, it falls within the scope of the activities of engineers specifically trained and experienced in sanitation. Such engineers are now being more and more generally called public health en-

* Read before the Public Health Engineering Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 10, 1935.

gineers. Public health engineering may perhaps thus be said to represent the broadest possible conception of the older and original term sanitary engineering.

Among the score or more of activities listed by Prescott and Horwood as within the scope of sanitation, currently viewed, it will be seen that a very considerable number are almost purely of an engineering character and that in the solution of the problems presented by the other undertakings, the engineer's services can be of very distinct value.

The newer appreciation of the value of the services of the public health engineer, in collaboration with other trained workers in public health units, was expressed by Herbert Clark Hoover who, while President of the United States, addressed this Association at its opening session on October 24, 1932, at the Sixty-first Annual Meeting held in Washington, D. C. In the course of his remarks he said [3]:

> As a result of this experience in the flood area [the Mississippi River flood of 1927] I later called a meeting of public health officials and suggested the development of a stronger health service. Out of the conferences which were called as an outgrowth of this meeting, there evolved the idea of the most effective means of strengthening the public health service in harmony with the spirit of our American institutions. By this, I mean the idea of the county health unit. That is, that every county in the United States should set up for itself, as its minimum health organization, a unit consisting of a doctor, a sanitary engineer, and a trained nurse. These units were established in 100 counties in the flood area, and the extraordinarily successful results of their work confirmed the wisdom of the plan. The public health in these counties for 18 months after the flood was so much better than it had been in the 18 months before the disaster as to prove an object lesson in what could be done by organized public health work.

It may be appropriate to remark in this general connection that the problems of environmental control, whether in urban or rural areas, and particularly in the former, are so complex and technical that, to quote from Barron,[4] "the work of the uneducated, untrained and undirected sanitary inspector no longer meets the needs of the present social order."

TYPICAL PROBLEMS AND ACTIVITIES IN ENVIRONMENTAL CONTROL

Environmental control or sanitation, from the standpoint of this discussion, may perhaps be divided into 10 classes or categories of activities, as follows:

1. The quantitative and qualitative control of the air supply
2. The quantitative, sanitary and esthetic control of the water supply
3. The control of the milk supply; production, transportation, pasteurization, sale and handling
4. The control of other food supplies; production, transportation, preservation, sale and handling of raw food products; canning; refrigeration
5. The control of liquid wastes: sewage, trade or industrial wastes; sewers, drains and treatment plants; ultimate innocuous disposal
6. The control of solid wastes: collection, transportation, treatment and disposal of municipal refuse, including garbage, rubbish, ashes, street sweepings, night soil, dead animals
7. The control of the animal and insect carriers of infection: rodents, dogs, goats, cattle, hogs, etc.; preventive and palliative measures against flies, mosquitoes, fleas, lice, ticks, etc.
8. The provision of environmental cleanness: street cleansing; dust, soot and smoke control; swimming pool sanitation; street paving; camps and camp grounds
9. The provision of sanitary conditions in factories, shops, schools, churches, theatres and houses
10. The control of nuisances and other unsatisfactory conditions including odors, obnoxious gases, excessive noise, and the like

ENGINEERING ASPECTS OF THE CONTROL OF THE AIR SUPPLY

The air supply is of significance both from the qualitative and from the quantitative standpoints. The qualitative problem presents itself both in-

doors and, in densely developed communities, out-of-doors as well. The quantitative problem is one of confined spaces only.

The qualitative problem refers to the condition and character of the air supply as related to temperature, humidity, foreign gases, dust, soot, and smoke. Of the 6 qualitative features just named, all are of concern and are practically controllable, within confined spaces. The 3 last named, and perhaps foreign gases, also, to a certain extent, are of concern in outdoor air and are to a reasonable degree controllable.

Air conditioning, as this term is employed today, comprehends the cleansing of the air by washing and/or filtration, its humidification or dehumidification, as the case may be, and its temperature adjustment to insure comfort for any stated or fixed degree of humidity. It involves air movement, also, and, to be satisfactorily performed, all of these conditions, as required, must be provided simultaneously.

Dust, soot and smoke, and poisonous gases such as carbon monoxide, are all controllable in degree at a cost. The several respective procedures in such control involve the paving and cleansing of streets, the effective combustion of fuels, adequate ventilation, suitable industrial processes and methods, and the use of dust precipitation or retention devices in connection with chimneys and flues of boiler plants and of dust-producing industries.

The effective combustion of fuel in industry may involve some capital outlay; but the saving in fuel will frequently offset all of the required costs and pay a handsome financial dividend in addition, not to mention the dividend of a vastly improved environment. The effective combustion of fuels (coal, wood, oil) in houses (residences) is not a simple or readily controllable matter. For one thing, too many persons and too many different sorts of people are involved.

Industrial sanitation, among other things, is concerned with the control of industrial processes and methods, whereby dangerous procedures may be eliminated, and poisonous and obnoxious vapors and gases, dust, etc., may be rendered harmless by removal, eradication, or neutralization.

The dust problem is one of significance because the inhalation of air heavily loaded with dust may and usually does, if continued over considerable intervals, produce a mechanical clogging of the lung tissues and passages. Certain types of dust produce very definite physiological derangements and diseases, such as silicosis, pneumoconiosis, lead poisoning, etc. Two sources of dust are to be recognized: those which are of the exterior and those which originate in enclosed spaces. Exterior sources of dust are streets, vegetation, and chimneys, flues, etc., ejecting smoke and soot as well as mineral dusts. Interior sources of dust are the wear and attrition of floors and the dusty trades or processes.

The dusty trades and processes are very numerous in our modern industrial world. Among them may be named the following: carding of wool and flax; grinding of metals and minerals; milling of wheat and other grains; crushing of stone, coal, and other minerals; manufacture of cement and other finely divided or ground products; sawing and planing of wood and wood products; polishing of a myriad of articles; weighing and sacking of powders and other dusty products; glass manufacture; street and indoor sweeping by brooms; sorting of wool, rags, etc.

Artificial ventilation concerns itself with public buildings in which great numbers of people congregate, such as

schools, churches, theatres, etc. It is also required for all long vehicular tunnels wherein large numbers of automobiles may be in transit at one time. It may be required for large garages which are not or cannot be adequately provided with direct window ventilation.

Some of the air supply problems and general control procedures have been outlined with a view to demonstrate that they are for the most part physical and mechanical in their nature and that they fall therefore within the field of engineering. Some of them are highly technical and involved, requiring special aptitude, training, and experience even for the engineer. The public health engineer in health departments will find many air control problems in which he must act in an advisory or even a directing capacity, particularly in populous areas, and, among these, especially in industrial districts.

ENGINEERING ASPECTS OF THE CONTROL OF THE WATER SUPPLY

The modern water works system must be dependable from the standpoint of physical safety; it must be able to yield an abundant, unfailing supply; and this supply must meet rigorous sanitary and esthetic standards. With the generally increasing pollution of both surface and sub-surface sources, the production of an uninterruptedly safe and satisfactory supply frequently becomes a very difficult matter. Important as it is that water supplies shall be free from all pathogens, and virtually free from all bacteria, that is not enough. To meet present-day requirements, turbid waters must be made brilliantly clear; hard waters must be softened; aggressive waters must be hardened or adjusted with respect to their hydrogen ion content; colored waters must be decolorized; tastes and odors must be removed, together with excessive iron, manganese, and other unwanted substances.

Preventive measures must oftentimes be exercised to restrict pollution, or the growths of plankton, or discoloration, or the causation of other unsatisfactory conditions amenable to control. In some cases the water sources have become polluted to such an extent with sewage and trade wastes that their purification for water supply purposes becomes in effect a salvage of sewage.

The works and procedures required to develop, transport, distribute, and treat water supplies are all of an engineering character. The problems presented frequently demand the highest skill and experience in their solution. In meeting the more difficult problems of treatment the engineer collaborates with the chemist, the bacteriologist, and other technical specialists.

It is the function of health departments to advise with respect to water quality problems and to exercise general supervisory powers to the end that the public health and comfort may be vouchsafed. The water supply is one of the most fundamental of public services and, because of its potentialities as related to disease, it is of extraordinary concern to health departments. State and county departments should maintain rather constant supervision over the water supplies coming within their jurisdiction, particularly the smaller ones whose personnel and equipment are limited. Such supervision should comprehend systematic inspections on the part of the public health engineering staff, with adequate sampling and laboratory checking.

In illustration of the water supply problems faced by a single county health department, that of Westchester County, N. Y., Barron [4] stated that there are in that county 23 sources of supply and 41 public distribution systems, a number so large that it would be difficult if not impossible for a state department of health to maintain

supervision without local engineering assistance. Improvements in equipment and operation of chlorination plants were found to be necessary in most cases. Corrosion problems were acute in several systems. Other important responsibilities were the prevention of pollution on watersheds, the promotion of improved public supplies in replacement of inadequate, unsuitable private supplies, and the improvement of private supplies which were found to have logical reasons for continued existence.

Fuller [5] calls attention to the importance of establishing a consistent policy with respect to all water supplies in any public health administrative district because of the frequency of changes in the personnel of the local water supply management boards.

ENGINEERING ASPECTS OF THE CONTROL OF THE MILK AND FOOD SUPPLIES

The mechanical problems of transportation, pasteurization, canning, and refrigeration of milk and other food products are essentially engineering in their nature and should be attacked and solved from such a viewpoint. Other correlated problems such as are referred to below, are not, of course, in the category of engineering activity, *per se*. Yet the methods of approach and the procedures utilized should be of the same order in respect to rationality and regimentation.

Referring again to the Westchester County experience, Barron [4] states that 35 health officials in that district had been issuing permits for the sale of milk. None of these officials had been able to examine the various milk supplies or to apply adequate and proper technical supervision to either the local or distant milk sources. The county health department established a balanced and effective control of the entire system of milk supply, comprehending the necessary inspections of all dairies, the veterinary examination of all herds, the making of bacterial counts of the supplies from all producers, and the systematic inspection of all tributary shipping stations, of pasteurization and bottling plants, and of distributing stations.

Health departments must develop sanitary regulations governing food-selling establishments and must see that these are enforced. Meat coming from sources other than those regularly inspected and approved by federal agencies should be inspected and stamped by the local authorities. The protection of all foods from insects and dust and from promiscuous handling in meat and fish markets, vegetable shops, delicatessen stores, bakeries, and the like, must be insisted upon and vouchsafed by systematic inspections.

ENGINEERING ASPECTS OF THE CONTROL OF SEWAGE AND INDUSTRIAL WASTES

The collection and innocuous disposal of a community's liquid wastes—sewage, trade wastes, and the like—is an absolutely fundamental necessity and a matter of vital consequence to the health and comfort of its people. The proper supervision and control of sewerage systems and sewage treatment and disposal plants ranks in importance with the control of the water, milk, and other food supplies. In this field the problems are almost wholly of an engineering character demanding training and experience of fully as high an order as that demanded by any other exacting public health engineering activity, not excluding water purification. As a matter of fact sewage treatment practice is less standardized, perhaps, than any other activity of the sanitary engineer.

The health authority, with the aid and advice of the public health engineer, can and should determine upon and develop an intelligent, rational public policy with respect to sewage and

trade wastes treatment and disposal. It can and should influence and direct public opinion to the end that suitable and adequate methods and means for treatment and disposal be provided by the responsible authorities. Existing plants should be regularly inspected and samples taken and examined in the laboratory to demonstrate the adequacy and efficiency of treatment. This is especially true of small plants with untrained operators and few or no laboratory facilities. Institutional and private plants generally fall within this category.

The disposal of raw or inadequately treated sewage has very often resulted in a serious contamination of inland streams, tidal estuaries, and even of ocean shores. It has frequently destroyed the esthetic value of water courses and has sometimes caused the water to be unfit even for an industrial use. Bathing beaches have become insanitary and objectionable in appearance. Notwithstanding the great potency of the several agents of self-purification, taken together, it must be clearly recognized that there is scarcely a stream in America long enough to insure complete redemption from the effects of sewage contamination judged by the criterion of safety for drinking purposes. It is obvious that the treatment of sewage may be necessary, therefore, in order to maintain the redeemable or esthetic character of any body of water into which it may be considered expedient to discharge the effluent. The degree of treatment, *i.e.*, the extent of improvement provided, must be determined by the conditions of each case. The kind of treatment will be largely determined by the degree of improvement demanded by these conditions considered in conjunction with physical and economic considerations. The problem is by no means simple. It demands skill and judgment born of experience.

ENGINEERING ASPECTS OF THE CONTROL OF REFUSE COLLECTION AND DISPOSAL

The municipal refuse problem has both a sanitary and an esthetic significance. Each is important. The most significant element of municipal solid refuse is the garbage. Inasmuch as this material constitutes a much-sought-after food for flies and rats, and provides an excellent breeding place for the former, its sanitary significance becomes obvious. Garbage, moreover, is highly putrescible and its decomposition gives rise to obnoxious odors. Its esthetic significance, therefore, becomes apparent. Some of the materials comprehended by the term rubbish, such as foul, dirty rags, have a public health significance. Rag sorting, for example, is recognized as one of the dangerous trades. Heaps of rubbish afford a haven for rodents and in that respect are to be reckoned with from the public health standpoint.

The community refuse problem is ordinarily presented in 4 distinct and more or less independent phases; namely, (1) the storage of the refuse, with or without segregation, on the householder's premises; (2) the collection of the refuse by the accredited agency; (3) the transportation of the refuse through the streets of the community; and (4) the proper disposal of the refuse as a whole (mixed refuse) or in separate portions (classified refuse).

The problems thus presented are complicated. In their physical aspects they are for the most part in the sanitary engineer's particular field of activity. Their solution represents an important item in the practical control of man's urban environment. Too often these problems have been relegated to untrained, disinterested administrators.

It is now being proposed in some quarters that the garbage of the community be ground up either by the individual householders or by the com-

munity at central stations, and disposed of by discharge into the sewers. Such disposal will add enormously to the organic matter load carried by the sewage and will place that burden upon the treatment plant or receiving stream. A definite policy with respect to such a procedure should be determined upon by the responsible authorities, including the health agency. It is a highly involved technical matter and should be so considered.

ENGINEERING ASPECTS OF THE CONTROL OF ANIMAL AND INSECT CARRIERS OF INFECTION

In the control of the animal and insect carriers of infection the public health engineer coöperates with the epidemiologist, the entomologist, and the veterinarian.

The carriers involved are: (a) man himself as the chief carrier of infective agents of mankind; (b) all animals subject to rabies; (c) rodents subject to fleas and bubonic plague; (d) animals which carry ticks, or are subject to tick infections; (e) hogs which convey *trichinella spiralis;* (f) cattle and hogs which are the intermediate hosts of *taenia saginata* and *taenia solium;* (g) cattle infected with bovine tuberculosis; (h) goats, cows and hogs which convey the organisms causing undulant fever; etc.

The principal insects involved are: (a) flies, biting and nonbiting, active and passive carriers of any and all pathogenic bacteria which cause intestinal and other diseases in man, including typhoid fever, cholera, bacillary dysentery and tularemia, together with the infective forms of many of the protozoa; the cysts of *Endameba hystolytica,* and the eggs of helminths which do not require an intermediate host, such as *ascaris lumbricoides* or *Hymenolepis nana;* (b) mosquitoes which are responsible for yellow fever, malaria, dengue and filariasis (bancrofti); (c) fleas which convey plague (*B. pestis*); (d) lice which convey the organisms of typhus, trench and relapsing fevers; (e) ticks which convey the organisms of relapsing fever, Rocky Mountain spotted fever, and tularemia; (f) sand flies or moth midges conveying the organisms of pappataci fever, and *Leishmania denovani,* the etiological agent of kala-azar (Leishmaniasis); (g) bedbugs, roaches, and ants which, while perhaps not directly concerned with the dissemination of the causative organisms of specific infectious diseases, are nevertheless unwelcome inhabitants of man's environment.

Some of the more important preventive measures available for the control of the mosquito and mosquito-borne diseases, such as the elimination of breeding places by the draining of swamps and shallow pools, the rectification of stream beds and channels, the filling of small holes and pools which cannot be drained readily, and the removal of vegetation from and the steepening of banks of ponds and streams, also the oiling of undrained or undrainable water surfaces at sufficiently frequent intervals, are all of an engineering character and can best be accomplished under the direction of the trained public health engineer.

Other preventive measures and those which are palliative for the control of the mosquito, as well as other insects and animal vectors, may well be conducted by engineers trained and experienced in such work.

ENGINEERING ASPECTS OF THE PROVISION OF ENVIRONMENTAL CLEANNESS

The major problems concerned with the production and maintenance of environmental cleanness are physical and mechanical in their nature and hence within the scope of the sanitary engineer's activities. Among the acts

which bring about or conserve cleanness are such obvious undertakings as the provision of street paving and the operation of street cleansing. The control of dust, smoke and soot is of fundamental importance from the standpoints of both health and comfort. Because of its relation to their comfortable use, even though the public health may be involved only secondarily, it is the duty of health departments to insist upon the continued cleanliness of all publicly used buildings, including comfort stations, and of all recreational facilities and areas.

Swimming pool sanitation has been included in this group of activities having to do with environmental cleanness although it is often set apart as an independent item because of its public health implications. Public swimming baths have already become a nationwide institution. Their numbers will doubtless continue to increase for some years to come. Swimming pool regulation has therefore become a significant public health measure in view of the great numbers of patrons involved and the danger of disease attendant upon the use of improperly designed, constructed, and operated baths. In the provision and maintenance of a suitable and satisfactory water supply, problems of filtration, plankton control, disinfection, water heating and circulation, etc., are all encountered. Other features of sanitation are vitally important, also, and demand constant vigilance. Swimming pools should be operated under permits and regulations of the resuponsible health department. They should be regularly inspected and samples of the water should be systematically collected and subjected to laboratory examination.

Health departments should assume responsibility for the training of operators and this training should be akin to that demanded for water works operators.

ENGINEERING ASPECTS OF THE PROVISION OF SANITARY CONDITIONS IN BUILDINGS

It is or should be the duty of health departments to regulate and inspect all plumbing, heating, ventilating, air conditioning, dust control, and other equipments and installations which affect the health, comfort, and general well-being of workers in factories and industrial plants of all kinds, of children in the schools, patrons of theatres and other meeting places, as well as residents in private dwellings, the last particularly with respect to plumbing and gas appliance installations. Many of the problems presented are of an engineering nature.[6] The control procedures should be directed by experienced persons gifted with common sense and the power of rational appraisement.

ENGINEERING ASPECTS OF THE CONTROL OF NUISANCES

Many of the nuisances occurring in urban areas arise out of a failure to control properly the environmental conditions briefly outlined above. In particular, nuisances are caused by excessive numbers of various sorts of insects; by odors from sewerage works, polluted streams and shores, refuse collection, transportation and disposal procedures, industrial plants, and the like; by obnoxious vapors and gases; and by excessive noise. Here again, the problems are frequently of a sort which demand the skill and training of the public health engineer in their solution.

SCOPE OF THE PUBLIC HEALTH ENGINEER'S TRAINING

Courses for the education and training of sanitary and public health engineers have been introduced and developed in a considerable number of the universities and larger technical colleges or schools in the United States.

Probably all degrees of training are provided therein, from the highly specialized courses giving comprehensive instruction in the art of sanitation, in addition to the basic curriculum of civil engineering, to those which might be more properly classed as almost strictly civil engineering with a limited amount of stress placed on water supply and sewerage problems only.

There can be no question that the ideal course should comprehend fundamental training in inorganic, organic, and physical chemistry, in bacteriology, microscopy, zoölogy and entomology, together with the more usual courses in water supply and sewerage engineering, and in water and sewage treatment. In addition there should be competent courses in water and sewage analysis and general laboratory technic, together with studies in the field of general sanitation.

The scope of the ideal public health engineering course has been suggested, it is believed, by the foregoing brief survey of the engineering aspects of environmental control. It is obvious that expertness or proficiency in all of these matters cannot be acquired at all in most institutions or, for that matter, in any institution within the usual time allotment. But a thorough grounding in the more essential principles and procedures can be acquired if the facilities are offered. Upon such a basis experience will soon develop the necessary proficiency if the engineer is of the right sort and remains a student while he practices his profession.

STATISTICAL REVIEW OF THE EMPLOYMENT OF PUBLIC HEALTH OR SANITARY ENGINEERS IN PUBLIC HEALTH DEPARTMENTS IN THE UNITED STATES

In 1934 the writer prepared a questionnaire which was sent to all state departments of public health, by which it was hoped to determine for each state:

1. The number of trained sanitary or public health engineers employed in the division or bureau of sanitary engineering of the state department of public health
2. The number of counties and municipalities which employ such engineers in their public health departments
3. The number of sanitary or other districts which employ such engineers and for what purposes
4. The number and names of counties having well organized, full-time health departments
5. The number and names of cities having well organized, full-time health departments

In those cases where the state department of public health had a division or bureau of sanitary engineering, the questionnaire was sent to the chief engineer or director; otherwise to the chief administrative officer of the board. Replies were promptly received from all but 7 of the 48 states. A second inquiry brought replies from 5 additional states; and a third, 1 more; only 1 state has failed to furnish the information desired.

In addition to the information requested, each state sanitary engineer was asked to express his judgment with respect to the lower population limit at which sanitary or public health engineers should or might reasonably be expected to be employed in the health departments of: (1) cities; (2) counties, exclusive of cities having population as great or greater than the lower limit set for (1) cities.

The information thus made available has been prepared in the form of a statistical summary for each state and for the United States, together with certain relevant data concerning the population, area, and population density of each state; the numbers of counties, total, total having populations in excess of approximately 50,000, and total having net populations of approximately 50,000 exclusive of cities having approximate populations of 50,000 or over; and the total number of cities in

each state having populations in excess of approximately 50,000.

PUBLIC HEALTH ENGINEERS IN STATE PUBLIC HEALTH DEPARTMENTS

Beginning with the epoch-making establishment of an engineering department by the Massachusetts State Board of Health in 1886, when Frederick P. Stearns (who later became one of the most distinguished engineers of his time) was appointed engineer to the board, an appreciation of the value of the services of engineers in state departments of public health has gradually been developed. It is no longer questioned that state departments of public health should maintain an engineering bureau and staff. Forty-three states already have engineering bureaus with full-time public health or sanitary engineers and one other state employs such an engineer on a part-time basis. The total number of trained engineers thus regularly engaged is about 190. In addition, several state health departments employ sanitary chemists and operate engineering laboratories, *i.e.*, for water and sewage analysis, primarily.

The statistics presented herein are intended to reflect reasonably normal conditions and, specifically, those of the year 1934. At present (September, 1935) relatively large numbers of engineers, presumed to be trained in public health work, in so far as such are available, are being employed throughout the country as an emergency relief measure. Many of these have been appointed to serve with the U. S. Public Health Service but have been assigned to work with state public health departments on various types of environmental sanitation projects such as sanitary privies, mosquito control, etc. Others are temporarily employed directly by the state health departments, their salaries being paid out of federal funds allocated for the purpose.

Whipple [7] has presented a clear picture of the effective work of the engineers of the Massachusetts State Board of Health from the beginning until about the year 1917.

Tisdale [8] has also given illuminating insight into the work of the state sanitary engineer. He quotes Whipple as having said, "Good advice by the sanitary engineer to cities and towns in the state, is on the whole more beneficial than all the permits, approvals and orders ever issued by a department." With respect to the work of state health departments, Tisdale calls attention to the vital quality of the sanitary engineer's services in matters of water supply and sewerage, sanitary milk production, joint federal and state sanitation programs (including stream pollution control), recreational sanitation, industrial wastes control, swimming pool sanitation, and sanitation legislation. He further emphasizes the salutary fact that the tenure of office of state sanitary engineers has been fairly secure and he cites the cases of a considerable number of engineers whose terms of service have ranged from 2 decades to nearly 50 years.

PUBLIC HEALTH ENGINEERS IN COUNTY OR COUNTY-UNIT HEALTH DEPARTMENTS

While a considerable proportion of our state departments of public health have long recognized the value of the services of sanitary and public health engineers in matters dealing with environmental sanitation, this unfortunately cannot be said with respect to county departments of health. It is only recently that an appreciation of the value of such service has begun to affect the operations of the smaller units of public health administration.

By reason of the multiplicity of village, town, and city governments and their various and ofttimes inconsistent and conflicting regulations, and

furthermore because of the all too common inadequacy of planning, construction and operation of sanitary facilities and the lack of recognition of local sanitation problems, as Barron [4] observes, there are many complications to be overcome in effectively accomplishing environmental control in counties and county health units. For these reasons the services of trained public health engineers, capable of recognizing and directing the solution of the many problems demanding attention and solution, are all the more necessary.

It appears that in the entire United States there are probably less than 25 public health engineers regularly employed in 21 county, county-unit, or district health departments in 10 states. On the other hand, there appear to be between 400 and 500 purportedly well organized, full-time county, county-unit, or district health departments, many if not all of which should enlarge the scope of their activities and increase their effectiveness by establishing bureaus of public health engineering and employing trained personnel.

In the 48 states there are 3,072 counties, of which number 437 have populations in excess of approximately 50,000, and 376 have populations exceeding approximately 50,000, exclusive of cities of approximately that same population.

Thirty-one state sanitary engineers were willing to express an opinion concerning the lower population limit of counties in which sanitary or public health engineers should or reasonably might be expected to be employed in the health departments thereof. These population limits were specified to be exclusive of the aggregate populations of cities having populations of sufficient size to warrant, in their opinion, the employment of sanitary or public health engineers in their own health departments. The opinions varied from "every county" and "every county health unit" to a population of 200,000 in one case, and 500,000 in another. The minimum assigned figure was 10,000. The mean of all of the estimates, expressed in numerical terms, is about 57,000. Exclusive of the two highest figures noted above, the average figure is about 34,000. It would seem to be rational to conclude that every county, county-unit, or district having a net population, as above defined, in excess of 50,000 at most should have the benefit of the full-time services of one or more public health engineers. In areas where the problems of sanitation are for some reason acute, or where the economic status of the population is high, public health engineers should be employed where the population is smaller, possibly much smaller, than the figure just named.

PUBLIC HEALTH ENGINEERS IN CITY HEALTH DEPARTMENTS

The appreciation of the value of the services of the public health engineer in the health departments of cities is apparently even less manifest than in county, county-unit, or district departments. It is also at least as recent. This lack of recognition is amazing in view of the great numbers of environmental sanitation problems demanding attention and solution in practically all urban areas, and particularly, of course, in the larger cities.

This matter has been well stated by Connolly [6] as follows:

> It was not so many years ago when people generally thought of the field of sanitary engineering as one limited to questions of water supplies, stream pollution, trade wastes, and the collection and disposal of garbage and sewage. Engineering methods have proved to be so successful that now they are being applied in many other lines of sanitation and at present the sanitary engineer is called upon to deal also with pasteurization of milk; protection of oyster-growing areas;

problems of housing, such as overcrowding, light, heat, and ventilation; malaria control; plague eradication; destruction of vermin; industrial sanitation; smoke abatement; noise reduction; protection of swimming pools and bathing beaches; special hazards of comparatively recent importance, such as poisoning by refrigerants, by gases and other substances used in fumigation, and by hair dyes, shoe dyes, moth-proofing compounds, etc.; and the abatement of nuisances of many kinds.

The sanitary engineer is or should be also particularly responsible for plumbing installations and cross-connections between the public and private water supplies.

Connolly [6] further states:

> The work of the city sanitary engineer is one that touches almost every phase of urban life in some way. The field is constantly growing as new materials and usages are developed. The scope is as broad as man's environment. The necessity for the work will continue as long as man continues to be a gregarious animal and seeks the company of his fellow man. It is truly a task to challenge all that is best in a man and reward him with the knowledge that he is doing his bit to make his city a more healthful, happy, and useful community, and to give to his children a better environment than his own has been. There is no question but that the next decade will see a tremendous development in the sanitary engineering activities in city health departments in all parts of the country, for we are living in an age of engineering achievement. Municipal administrative health officers not provided with such a bureau in their departments are at a distinct disadvantage when dealing with many of the present-day developments, and are now asking their city councils to permit them to follow the example of the United States Government and of so many state health commissioners, in creating an efficient, modern sanitary engineering bureau. The public realizes as never before that in this era of specialization, specialists in this field will do much to make life richer and more enjoyable as well as longer.

The information gathered in connection with this study indicates that there are probably not more than 30 public health engineers employed in 24 city health departments in 13 states. There appear to be approximately 320 well organized, full-time city health departments in the United States, practically all of which should follow the example of such cities as Atlanta, Chicago, Cincinnati, Cleveland, Dallas, Detroit, El Paso, Fort Worth, Jacksonville, Memphis, New York, St. Louis, and Tucson, in enlarging the scope of their activities and increasing their effectiveness by establishing bureaus of public health engineering manned with trained, capable engineers.

In the entire country there are 211 cities having populations of approximately 50,000 or over and some 280 whose populations are 35,000 or over.

Thirty-five state sanitary engineers kindly gave thought to the determination of a lower limit of population of cities in which sanitary or public health engineers should or might reasonably be expected to be employed in the health departments thereof, and expressed their opinions in numerical terms. The assigned figures ranged from a minimum of 2,500 to a maximum of 100,000. The average of the 35 values submitted is about 34,000, or the same as the mean figure for county health departments excluding the two highest figures, as above noted. The average of 24 similar estimates of a lower population limit obtained by the Committee on Municipal Public Health Engineering, Public Health Engineering Section, this Association, is 40,000. The figures submitted range from 5,000 as a minimum to 100,000 as a maximum. It would seem to be fair to conclude that every city having a population of 50,000 at most should enjoy the benefit of the full-time services of one or more sanitary engineers in an organized, properly equipped bureau. In well-to-do communities or those facing acute sanitation problems the lower limit of size for which such services are provided should unquestionably be smaller; in some cases only

a fraction of the population size stated above as a mean of the several estimates. If the supervision of water and sewage treatment plants is also assigned to the health department engineer, the population limit might well be lowered to 10,000 or even 5,000.

SANITARY DISTRICT ORGANIZATIONS

Inquiry was made to determine the number of sanitary districts employing trained sanitary engineers for the conduct of their activities. Such districts are ordinarily charged either with water supply and sewerage undertakings, including treatment, or with mosquito eradication, as the case may be. The information secured indicates that there are at least 32 such districts in 9 states.

FEDERAL SERVICE

No attempt has been made to determine what federal agencies employ sanitary engineers other than the U. S. Public Health Service. In that service the sanitary or public health engineers enjoy the same rank and pay as do the medical officers and are in line for promotion under similar regulations. The total number of engineers now authorized and commissioned is 22, distributed in rank as follows: senior surgeons (senior sanitary engineers), 1; surgeons (sanitary engineers), 15; passed assistant surgeons (passed assistant sanitary engineers), 5; assistant surgeons (assistant sanitary engineers), 1.

It is gratifying to realize that for many years the Service has exerted a stimulating influence with respect to the employment of public health engineers in state health departments and elsewhere and more recently in the health departments of smaller administrative units.

CONCLUSIONS

The environmental control activities which demand or at least would be definitely promoted by the services of trained public health engineers can be placed in 10 categories, as follows: (1) the water supply; (2) the air supply; (3) the milk supply; (4) food supplies other than milk; (5) liquid wastes (sewage, industrial wastes, etc.); (6) solid wastes (municipal refuse); (7) animal and insect carriers of infection; (8) environmental cleanness; (9) sanitary conditions in buildings; (10) nuisances and other unsatisfactory conditions.

The writer has attempted to outline and briefly discuss the engineering aspects of each of these groups of activities and to show in what more or less specific respects the training and experience of the sanitary or public health engineer would be of particular avail. It has been demonstrated, it is hoped, that the number of phases of environmental sanitation in which the services of the trained engineer can be of material worth, is very large. In a not inconsiderable proportion of these undertakings his services are, in fact, well nigh indispensable if the most effective results are to be secured.

It is no longer questioned that state departments of public health should maintain an engineering bureau and staff of trained sanitary engineers. Forty-three state departments are already so organized and employ at least one full-time engineer. Another state employs a sanitary engineer on a part-time basis.

It is only recently, and as yet in a pitifully small way, that appreciation of the value of such service has been recognized and expressed by the employment of public health engineers in the smaller units of public health administration: county, district or unit, and municipal.

Summarized statistics of employment of public health engineering services in these units have been presented in the foregoing discussion.

There are 22 sanitary engineers regularly commissioned in the U. S. Public Health Service.

It is apparent that there is an enormous potential field for the useful work of the public health engineer in federal, state, district or county, and municipal public health departments. The most effective progress of environmental sanitation throughout the United States and the welfare of the engineer are both deeply concerned.

RECOMMENDATION

The writer recommends that the Committee on Scope of Technical Activities of the Public Health Engineering Section of this Association prepare a circular which can be sent to the responsible administrative officers of all state, county, county-unit, district, and municipal health departments outlining the character and value of the services of the trained public health engineer in such organizations.

ACKNOWLEDGMENTS: The writer wishes to express his obligation to the state sanitary engineers and medical directors of state public health departments who have so kindly furnished the statistical information concerning the employment of public health engineers in the several types of administrative units which have been discussed and concerning the names of counties, county-units, and cities which maintain well organized, full-time health departments.

Several of the state sanitary engineers offered very helpful criticisms and suggestions, particularly Bair, Boyce, Ferguson, Morton, and Stevenson. The writer is also indebted to N. M. Fuller and Professor Thorndike Saville for valuable comments and to William H. Cary, Jr., Chairman, Committee on Municipal Public Health Engineering, this Section, A.P.H.A., for useful data concerning the employment of public health engineers in municipal public health departments in the United States.

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Life Expectation

IN England and Wales in 1875 the average expectation of life of males at birth was 41 years and of females 44 years.

Now let us see the position today. The average expectation of life of males at birth is 57 years and of females 61 years. This is a remarkable change. In the short period from 1875 to 1935 the length of life in males has increased by 16 years and the length of life for females has increased by 17 years.—James Fenton, M.D., Public Lecture to the South African Health Congress, *J. Roy. San. Inst.*, May, 1936, p. 642.

Detection of Shedders* of Streptococci Responsible for Infectious Bovine Mastitis†

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DURING the past few years increased interest in the control of bovine mastitis has caused a corresponding increase in the study of streptococci commonly found in freshly drawn milk. In order to secure further data on the characteristics of these organisms and their possible relation to chronic bovine mastitis, milk samples were collected aseptically from each quarter of lactating animals in 15 different herds. The samples were examined for evidence of mastitis and the presence of streptococci. Cultures of streptococci obtained from 970 samples have been isolated and studied. It is the purpose of this paper to describe the characteristics of these organisms, their relation to other laboratory evidence of mastitis, and the relative efficacy of different methods in detecting shedders of streptococci.

METHODS

The following determinations were made on each sample: physical appearance, reaction to bromthymol blue, leucocyte count, sediment volume, types of colonies produced on blood agar plates, and the presence or absence of chains of spherical cells in incubated portions of the sample. Streptococci, when present, were isolated and the following properties determined: hemolysis on cow's blood agar, reaction in litmus milk, ability to hydrolyze sodium hippurate, ability to reduce methylene blue milk (1:5,000), and ability to produce a distinctly acid reaction with Andrade's indicator in serum broth containing lactose, mannitol, inulin, raffinose, arabinose, and salicin.

CHARACTERISTICS OF STREPTOCOCCI STUDIED

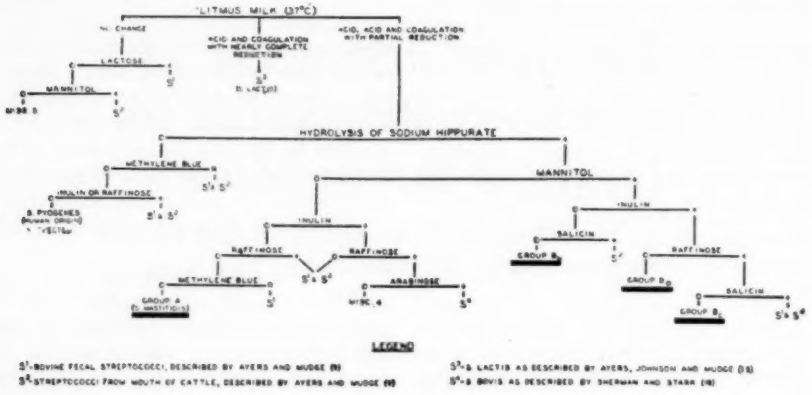
By comparing the biochemical properties of each culture with the presence or absence of laboratory evidence of mastitis at the time and after the cultures were isolated, it was found that the different streptococci studied could be placed in one of three groups: Group A, designated as *Streptococcus mastitidis*, which appears to be the principal causative agent in infectious chronic bovine mastitis; Group B, which appears to be associated with a relatively mild form of mastitis from which animals usually recover; and a group composed of various types of saprophytic streptococci commonly found in the mouth, on the skin, and in the excreta of cattle. The principal

* The term "shedders" is used to designate lactating animals which eliminate the organism in question through the milk.

† Read before the Laboratory Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

FIGURE 1

PLAN FOR IDENTIFYING WEAKLY HEMOLYTIC STREPTOCOCCI OF BOVINE ORIGIN



differential properties of each of the three groups are shown in Figure I.* Cultures classed as saprophytes are designated as S^1, S^2, S^3, and S^4.

Streptococcus mastitidis (Group A)—Members of this group are identified by the following characteristics: they acidify and coagulate litmus milk with partial reduction of litmus; hydrolyze sodium hippurate; fail to produce a distinctly acid reaction in serum broth containing mannitol, inulin, raffinose, arabinose, and sorbitol; and do not, as a rule, reduce methylene blue milk. Reactions in trehalose, salicin, and glycerol broth were found to be variable.

Streptococcus mastitidis (Group A) differs from *Streptococcus pyogenes* by producing surface colonies on blood agar that are surrounded by a narrow band of partial hemolysis, which is in marked contrast to the wide band of complete hemolysis usually produced by colonies of *Streptococcus pyogenes*. The mastitis organism hydrolyzes sodium hippurate and is a high acid producer in dextrose broth. As a rule, the reactions of the two organisms in litmus milk differ also; the human pathogen produces an acid reaction without coagulation and without reduction, while the animal pathogen causes an acid reaction with coagulation and partial reduction of the litmus.

Group B—This group is not as well defined as Group A. Members of Group B differ from those of Group A by fermenting mannitol, by usually reducing methylene blue milk, and by fermenting either inulin or raffinose, or both.

Saprophytes—This group contains various types of saprophytic streptococci which have been described [2, 3, 4] as common inhabitants of the mouth, skin, and excreta of cattle. While these organisms differ considerably in their biochemical properties, they may be distinguished from *Streptococcus mastitidis* (Group A) and the organisms in Group B, by their reaction in litmus milk and by their fermentative properties in carbohydrate broth.

RELATION OF DIFFERENT TYPES OF STREPTOCOCCI TO MASTITIS

Cultures obtained from samples drawn from individual quarters of animals in 15 experimental herds were

* Figure I has been described previously in Storrs Experiment Station *Bulletin 195*.[1]

identified by the use of the diagram shown in Figure I. The milk samples were also examined for other evidence of mastitis; namely, a leucocyte count of 500,000 or more cells per c.c., sediment volume of 0.5 per cent or more, and a positive reaction to the bromthymol blue test. The number of cultures placed in each of the three general groups described, and the relation of the cultures to other evidence of mastitis, are shown in Table I.*

TABLE I

RELATION OF DIFFERENT TYPES OF STREPTOCOCCI OF BOVINE ORIGIN TO EVIDENCE OF MASTITIS

Source	*Number of Cultures*	*Identified as*		*Number Associated with Other Evidence of Mastitis*	*Number from Apparently Healthy Quarters*
		Group	*Number*		
15 experimental herds	970	A	828	809	11(8)*
		B	56	46	10
		Saprophyte	86	3	83

* No data following time culture was isolated.

Of 970 cultures examined, 828 were placed in Group A, 56 in Group B, and 86 were regarded as saprophytes. Of the 828 Group A cultures, 809 or 97.7 per cent were associated with other evidence of mastitis. Forty-six of the 56 cultures placed in Group B were also from quarters showing evidence of mastitis. Only 3 of 86 cultures classed as saprophytes were from diseased quarters. In these instances, it appears probable that streptococci which are ordinarily harmless gained entrance to the affected quarter as a result of a previous injury.

DETECTION OF STREPTOCOCCI RESPONSIBLE FOR MASTITIS

Three hundred and sixty samples of milk collected from the college herd in 2 of the regular bi-monthly tests were examined for the presence of streptococci by 6 different methods. Blood agar plates were inoculated by 3 different methods: (1) streaking with whole milk, (2) streaking with sediment from a centrifuged (10 c.c.) portion of the given sample, and (3) the standard dilution method. Microscopic examinations were made of films prepared from whole milk, sediment from a centrifuged 10 c.c. portion of the sample, and from a portion of the same sample following incubation over night at a temperature of 37° C. The results obtained are recorded in Table II.

Of 79 samples from quarters showing laboratory evidence of mastitis, as revealed by one or several of the tests employed, streptococci were found in 77.2 per cent, when the blood agar plates were streaked with sediment. Blood agar plates inoculated by the usual dilution method were about equally effective. Microscopic examination of films prepared from whole milk and from milk sediment revealed the presence of streptococci in only 3.8 and 8.9 per cent of the samples, respectively.

Microscopic examination of films prepared from incubated milk proved to be the most effective of the 6 methods in detecting the presence of streptococci responsible for bovine mastitis. This method revealed the

* In practice it is not necessary that cultures of streptococci of bovine origin be examined for ability to hydrolyze sodium hippurate, unless the culture is sufficiently hemolytic to suggest that it may be *Streptococci pyogenes*.

TABLE II

DETECTION OF STREPTOCOCCI IN FRESHLY DRAWN MILK SAMPLES

Method Used		Diseased Quarters † Per Cent of Samples Yielding Streptococci	Healthy Quarters Per Cent of Samples Yielding Streptococci *
Blood agar plate	Whole milk-streak	60.8	1.1
	Sediment-streak	77.2	2.5
	Standard dilution	76.0	0.7
Microscopic examination	Direct	3.8	none
	Sediment	8.9	none
	Incubated milk	98.7	13.5

* Saprophytic streptococci and diphtheroids producing streptococcus-like colonies on blood agar plates.
† Quarters affected with chronic streptococcic mastitis.

presence of streptococci in 98.7 per cent of the samples collected from animals affected with chronic streptococcic mastitis. Unfortunately, about 13.5 per cent of the samples from healthy quarters also yielded chains of streptococci by this method.

SIGNIFICANCE OF THE FINDING OF STREPTOCOCCI IN INCUBATED MILK

Of 360 samples of unincubated milk used in the comparative tests, 50 failed to yield colonies of streptococci on the blood agar plates, but revealed streptococci by the direct microscopic examination of the incubated samples. Information on the significance of demonstrating streptococci in these samples was obtained by comparing the finding of streptococci with other laboratory evidence of mastitis, and by isolating and identifying the streptococci in the incubated samples. The results are given in Table III.

Thirty of the 50 samples showed no other evidence of mastitis either at the time or immediately following the test. Cultures obtained from these samples were identified as saprophytes. Three other samples that showed no other evidence of mastitis at the time of the test, were from quarters that gave evidence of mastitis 2 weeks later, when cultures obtained from these quarters were identified as *Streptococcus mastitidis* (Group A). Microscopic examination of incubated milk revealed the presence of streptococci in 16 samples that gave other evidence of mastitis, but no colonies of streptococci on blood agar inoculated with the samples before incubation. Seven of the 16 samples were from recently infected quarters,

TABLE III

SIGNIFICANCE OF THE FINDING OF STREPTOCOCCI IN INCUBATED MILK

Number of Instances	Number of Quarters	Laboratory Evidence of Mastitis: 2 Weeks Preceding Test	At Time of Test	2 Weeks Following Test	Usual Type of Streptococci Isolated
50	30	0	0	0	S
	3	0	0	+	A
	1	0	+	0	S
	7	0	+	+	A
	9	+	+	+	A

and 9 from quarters known to have been affected with chronic mastitis for some time. Cultures from these quarters were identified as *Streptococcus mastitidis* (Group A).

SUMMARY

The data presented confirm the opinion of others [5, 6, 7, 8] that the common cause of infectious chronic mastitis is a fairly well defined species or type of streptococcus, easily differentiated from *Streptococcus pyogenes* of human origin. A plan is described for differentiating *Streptococcus mastitidis* (Group A) from weakly pathogenic and saprophytic streptococci of bovine origin.

Microscopic examination of incubated milk samples was found to be the most effective of 6 methods used in detecting shedders of *Streptococcus mastitidis* (Group A). As saprophytic streptococci may occasionally be found in incubated samples from healthy quarters, the significance of the finding of streptococci in incubated samples from healthy quarters, in the absence of other evidence of mastitis, or during the first 2 and last 4 weeks of the lactation period, can be determined only by isolation and identification of the streptococcus found.

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Maternal Mortality

. . . Unhappily, we are not in the same fortunate position with regard to the maternal death rate; that is to say, the deaths of mothers in connection with confinement. Confinement is a natural and normal process in which women are concerned in fulfilling the most important function of their lives, namely, providing the future generation. Childbirth is not a disease and should be free from death and danger; but in England and Wales, out of every 1,000 births, there are 4 deaths of mothers arising from pregnancy or confinement, and unfortunately this figure is not showing any decline. The figure 25 years ago was 3.87. It is appalling to think that 4 women in every 1,000 lose their lives in performing this natural function. The general death rate, as I have shown, has gone down by more than one-third since 1875; during the present century, the infant death rate has been reduced by nearly two-thirds; but the maternal rate has, in fact, shown an increase. This situation causes great concern to all interested in the well-being of women and small children.—James Fenton, M.D., Public Lecture to the South African Health Congress, *J. Roy. San. Inst.*, May, 1936, p. 644.

Diphtheria Immunization*

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THE most important question in diphtheria immunization today is whether or not alum precipitated toxoid is proving to be the satisfactory one-injection immunizing agent which preliminary work promised it would be. In answering this question a table has been made of the available figures on the use of alum precipitated toxoid (Table I). The results listed are from the use of single injections. They are analyzed to show the percentage immunized, the interval before the re-Schick, and the reactions from the alum precipitated toxoid. The results of McGinnes, *et al.*[3] and of Newitt[7] are especially interesting for the information they give on the durability of the immunity resulting from a single injection of alum precipitated toxoid. We must conclude from the results available that a single injection of alum precipitated toxoid is at least as potent in changing Schick positive children to the Schick negative state as the usual 2 or 3 injections of a non-precipitated toxoid with a potent preparation, and probably superior to the 3-injection toxin-antitoxin routine. Our ultimate approval of alum precipitated toxoid must now await upon proof that it is just as effective in conferring resistance to actual exposure to diphtheria.

The next important question is when should the Schick test be used? The consensus of opinion seems to be that if the immunizing is done in the most important age group, the preschool children, a pre-Schick is unnecessary. However, additional evidence has been presented during the last year by Greengard and Bernstein[8] which would tend to obligate the use of the Schick test in the infant under 9 months of age, because they find that the passive immunity received from the mother and responsible for the high percentage of Schick negative individuals at 6 months of age will interfere with active immunization with toxoid, leaving the Schick negative infant susceptible as soon as its passive immunity wears off. Whether or not this would apply as well to alum precipitated toxoid immunization is a question which only research can answer. As for the post-Schick, it would at first glance seem unnecessary to use it in the routine mass immunization of children after such a good immunizing agent as alum precipitated toxoid. Certainly from a public health standpoint the 5 or 10 per cent remaining unimmunized would have a negligible effect on the diphtheria incidence. We feel, however, that abandonment of the post-Schick test is ill advised, not only because of its value as a check on the immunizing agent and the technic, but even more important, because the result of the post-Schick test gives us the answer to that unavoidable question, "Why has

* Read at a Special Session on Diphtheria Immunization of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 8, 1935.

my child, who has been injected, contracted diphtheria?"

As long as diphtheria is present in the country we will always have diphtheria in injected individuals not rendered Schick negative. The very fact that they resisted the immunizing treatment classifies them with those most likely to contract the disease. From the standpoint of the individual, as well as for the good repute of immunization practice, it would seem imperative to be able to say whether or not the immunizing treatment has been successful.

Further studies on other immunizing agents against diphtheria have appeared in the literature during the past year. Studies have been reported by Silberschmidt [9] on immunity in animals 16 days after the first inhalation of diphtheria toxoid. Leach, Jensen, and Póch [10] in studies on immunization with a single injection of purified toxoid plus aluminum hydroxide, found that all of 148 children studied gained in antitoxin following its use. Ramon and coworkers,[11] working on ointment immunization against diphtheria, showed that the skin must be broken by shaving or rubbing to obtain success. Bunney [12] has reported on intradermal injection with a toxoid-toxin mixture and found a doubling of the final antitoxin level from all immunizing procedures tried if as little as 0.5 L_f's of toxoid was contained in the pre-Schick test material. Although some of these may prove worthy of being used with or in place of alum precipitated toxoid, we do not believe available data warrant their recommendation for routine use

TABLE I

RESULTS OF IMMUNIZATION WITH ALUM-PRECIPITATED TOXOID

Age Group	*No. of Individuals*	*Pre-Schick Test*	*Interval Between Imm. Injection and Re-Schick*	*Per Cent Immunized*	*Reactions*	*Ref.*
Children	98	Pos.	8 weeks	94	No severe reactions	Wells, *et al.*[1]
School age	99	Pos.	2-6 months	94	Same as ordinary toxoid	Graham, *et al.*[2]
School age	86	Pos.	2-6 months	91	Same as ordinary toxoid	Graham, *et al.*[2]
444 preschool	613	Not done	2–4 months	97	Same as ordinary toxoid	Graham, *et al.*[2]
Children	1,765	Pos.	2 months	94	Same as ordinary toxoid	McGinnes, *et al.*[3]
Children	347	Pos.	1 year	95	Same as ordinary toxoid	McGinnes, *et al.*[3]
Preschool	264	Pos.	8 weeks	100	No moderate local, no general reactions	Shrifrin [4]
School and preschool	301	Pos.	8 weeks	94	2 moderate local, no general reactions	Shrifrin [4]
Adults avg. age 40 yrs.	196	Pos.	8 weeks	58	7% moderate local and general reactions	Shrifrin [4]
380 preschool, 208 school age	588	Pos.	63 days	98	Same as ordinary toxoid	Newitt [5]
4–19 years	53	Pos.	60 days	94	1 severe, 5 moderate general reactions	Keller & Leathers [6]
4–19 years	23	Pos.	42 days	100		
School and preschool	123	Pos.	1 year	89	Same as ordinary toxoid	Newitt [5]
Children	197	Pos.	2–3 months	100		Baker & Gill [7]
Children	1,400	Not done	2–3 months	99	0.05% abscesses	Baker & Gill [7]

at the present time. It might be well to point out here, however, that the work of Underwood,[13] and of Parish, Edin, and Wright[14] on the incidence of diphtheria caused by the virulent gravis strain of the diphtheria organism emphasizes the need of striving for the highest level of circulating antitoxin. They show that the usually accepted immunity level of antitoxin is not sufficient to protect against infection with this strain. In other words, in choosing immunizing procedures it may not be enough simply to choose those that convert a reasonable number of Schick positive children to the Schick negative state.

Other reports of interest in diphtheria immunization are those of Kuk Choun[15] on the relationship between the nutritive state of the animal organism and its response to active immunization. He found that animals on a diet rich in vitamins and receiving plenty of sunlight responded best to injections with a diphtheria antigen. The work of Tsen[16] on immunization against diphtheria and scarlet fever with the combined toxoids gives additional information on this important possibility. Further work needs to be done in both these fields, and their importance is obvious.

It might be pertinent in closing to point out some of the things which as yet we do not know about alum precipitated toxoid. We do not know the importance of the potency of the product—for instance, whether or not it makes any difference if the product is just good enough to pass the National Institute of Health requirements or is several times as potent. We know little about the stability of the immunity resulting from its use as compared with that resulting from the use of the unprecipitated toxoid given under the same conditions and at the same time. We have little available data as to the value of the product in the older age groups and can make no recommendations as to the dosage or interval to be used in these groups. We have little data on the stability of the product under ordinary conditions of storage and handling. We do not know if it will actively immunize 6 month old babies who have retained passive immunity from their mothers. Further carefully controlled studies are certainly needed on these phases of diphtheria immunization.

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Determination and Estimation of Residual Chlorine*

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RESIDUAL or free chlorine may be estimated either by the starch iodide method, by titration with thiosulphate, or colorimetrically with orthotolidine. Each method has its drawbacks, but of the 3, orthotolidine is the most sensitive, lends itself most readily to field use, and requires but 1 manipulation; namely, the addition of the indicator which produces a color varying in intensity with the quantity of chlorine present.

Thiosulphate cannot be used in water or sewage works practice because it is not sensitive to the residuals encountered in such work which usually run below 1.0 p.p.m. Starch iodide was used when chlorine was first introduced, but gradually gave way to orthotolidine after its standardization in 1913 by Ellms and Hauser[1] and its popular development by Wolman and Enslow[2] in 1919. Recent research indicates that a starch solution preserved with zinc chloride and used without acid at lowered temperatures may be very useful in distinguishing false residuals due to nitrites or manganese from true residuals.

The difficulty of preparing fresh standards consisting of known amounts of chlorine with each test prompted the preparation of permanent standards by Ellms and Hauser from potassium dichromate and copper sulphate. These standards were adopted by the American Public Health Association as the official standards for the determination of residual chlorine with orthotolidine. Certain discrepancies have been found and commented upon by Muer and Hale,[3] and by Adams and Buswell,[4] but the values given in the latest (1933) edition of *Standard Methods of Water and Sewage Analysis* of the A.P.H.A. are the values accepted by the profession.

Prior to the 1933 edition of *Standard Methods* the tube length for the matching of the developed color with the standard was not mentioned. This omission has caused considerable confusion among many workers, some of whom proceeded to match the colors in containers varying all the way from the original 300 mm. depth to 30 or 40 mm. When commercial comparator sets appeared on the market, complaints were received of their supposed inaccuracy, many of which were explained when it was found that the dichromate standard made for a 300 mm. depth had been compared through a 13 or 26 or 30 mm. depth with a liquid or glass standard which had been compensated for just this thing.

This mistake may be pardoned when one considers the large number of workers using the test who have had little, if any, technical training. It is only natural the average person in charge of a small water plant would assume

* Read before the Laboratory Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 8, 1935.

that if he cut down the standard and solution containing orthotolidine proportionally, he would get comparable results. This would be true of 2 chlorine solutions or 2 dichromate standards of the same strength, but it is not true of dichromate standards and the yellow color of orthotolidine in the presence of chlorine, because both colors are not of the same character: that is, they do not have the same absorption bands.[5]

This may be better understood when we remember that the reason we see green, red, etc., is because the object observed absorbs the colors other than those seen. Thus a red object absorbs the colors on the violet end of the spectrum, reflecting only the red. Likewise, blue objects absorb the red rays, reflecting only the blue.

In orthotolidine work solutions are compared and light is transmitted rather than reflected. This alters the picture of reflected light, for each molecule of dye stuff in solutions absorbs certain percentages of light, transmitting the rest. Thus the number of molecules in a solution governs the amount of light that passes. As an example, "if a 1" depth of solution passes 70 per cent of the light, a 2" will pass 70 per cent of 70 per cent, or 49 per cent. Likewise, a 1" solution twice as strong will only transmit 49 per cent. In either case the light ray has twice the number of molecules in its path."[6]

Figure 1 shows how the apparent color of various strengths of color of orthotolidine in the presence of varying amounts of chlorine shift when viewed through the same depth.

It is to be noted how the color shifts from the greenish yellow toward red as the concentration goes up.

The spectrophotometer reveals the following curves (Figure 2) for orthotolidine and for dichromate solutions at 30 cm. depth. It is to be noted they are quite similar but not identical, though the average color is the same. The copper sulphate in the permanent standard absorbs reds. Since there is no counterpart to this absorption in the orthotolidine color, this accounts for the difference.

FIGURE 1

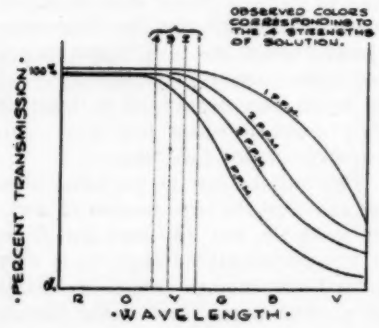
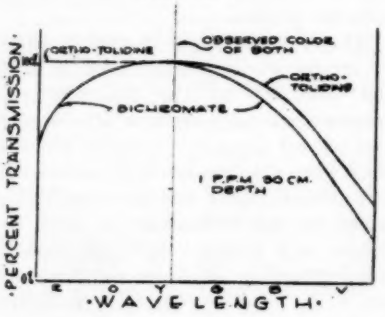


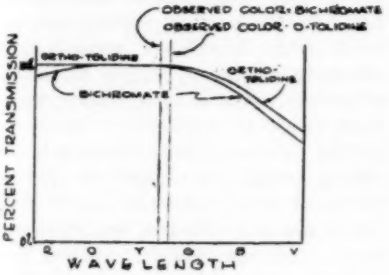
FIGURE 2



When these same solutions are compared at a 3 cm. depth, we get the effect portrayed in Figure 3.

Both solutions here appear lighter and more green than at the 30 cm. depth, but they no longer match. This is because the permanent standard has had an increase in transmission at the red end which pushes the observed color of this standard nearer this end. The orthotolidine color did not move in this direction because it already had 100 per cent transmission of color at that end of the spectrum.

FIGURE 3



While the curves shown in Figure 3 are not strictly accurate in all details they do portray why permanent standards must be compared with orthotolidine color at the 300 mm. depth unless corrections for these differences are made as they are in all commercial comparator sets.

Other difficulties encountered in the determination of residuals include the color of the tubes, the character of the light, cleanliness of the glassware, position of the tubes when comparing, and even the speed with which comparisons are made.

When the long tubes are used for comparison, the color of the glass may at times make a difference as great as 100 per cent, particularly in the lower values on the order of 0.01 p.p.m. to 0.20 p.p.m. The shades usually run from a light blue-green through a reddish brown to one that appears almost black. The light blues or greens appear to give the best results; the browns making matching difficult.

North daylight is best and even then when very accurate results are desired, days when the sun is alternately obscured should be avoided. A slightly overcast sky will give best results. Very consistent results may be secured by using an artificial daylight lamp and lens both day and night for routine work.

Position of the tube is very important. When close readings are desired, a higher and lower standard should be held on either side of the unknown and their position should be shifted frequently.

One should not look at the tubes for any length of time because the eye soon becomes fatigued in respect to color with the result that the shades may blend resulting in the hopeless confusion of the observer.

Reference to cleanliness of glassware may seem out of place, but I have seen false residuals produced by the solution of manganese from the pores of tubes by the HCl in the orthotolidine reagent.

Compensation for color or turbidity is of course impossible when the long tubes are used. This necessitates either going to one of the commercial sets or making special standards for use in bottles adjusted to a shorter observing depth.

There is little need to discuss here the effect of interfering substances, such as manganese, iron or nitrites on the test, since those subjects have been adequately gone into by R. D. Scott in the *Journal of the American Water Works Association,* May and September, 1934, and in the February, 1935, issue of *Water Works & Sewerage,* and by the writer in the *Journal of the American Water Works Association,* July, 1935.

It is perhaps sufficient to say that nitrites up to 0.1 p.p.m. cause errors of less than 0.01 p.p.m.[7, 17] but above 0.1 appreciable error will result while manganese in almost any quantity will give a false residual and should always be taken into account.[8, 9, 10] Iron in the ferric state, and especially when combined with organic material, may cause appreciable errors.[11, 12] Hulbert,[17, 18] Berliner,[19] Braidech,[20] and Hedgepeth,[21] have all noted the effect of nitrites in water on orthotolidine, but the effect of nitrites in sewage on the test has been given little attention.

Field experience indicates that they give little trouble here for false residuals have seldom been noted in sewage even where large amounts of nitrites were present.

In general, when the yellow color of orthotolidine is abnormally slow in developing or is off shade, one should suspect false residuals. Before this happens, of course, the water should be checked for presence or absence of interfering substances, and corrective measures taken.

Buswell and Boruff [13] in 1925 indicated that temperatures between 20° and 35° C. have little effect on the final readings, but that the readings will become progressively lower or progressively higher above and below these values and experiences in the field have checked these results. This leads to the conclusion that it might be well if all orthotolidine readings were made at a uniform temperature of about 20° C. When the temperature of a water falls below that point it can be readily raised without loss of chlorine by placing the sample in a warm water-bath for a few minutes. Some operators place the samples over radiators for a period which experience has taught them is sufficient to raise the temperature to the required point. It is quite probable that some of the taste difficulties encountered during the cold months may be due to chlorine in excess of the amount measured when the tests have been conducted on unwarmed water.

We are often asked for a method of determining between chlorine and chloramine residuals. To date, no entirely successful test has been evolved. Scott [14] mentions the use of the methyl red test which does give an indication of the presence or absence of chloramines, but this test is seldom wholely relied upon.

Attention has been drawn several times to the blue or bluish green color produced when the tube in which the yellow color of chlorinated orthotolidine has been produced is emptied and refilled with chlorinated water. This off-shade is probably due to the action of minute traces of orthotolidine which have stuck to the glass. Since the acidity of this adhering indicator is not strong enough to change the pH of the water appreciably, the blue or blue-green appears. It has been reported that a few exceedingly alkaline well buffered waters have produced these green or blue-green shades with the regulation amounts of orthotolidine. The effect is usually due, however, either to the addition of insufficient amounts of orthotolidine to 100 c.c. of water or the addition of the regulation amount of orthotolidine to a large volume of water. Either procedure might produce the same results.

Estimation of residuals in sewage is particularly difficult due both to turbidity and color. Turbidity may be easily compensated for by placing a second container of sewage having no orthotolidine ahead of the standard and a bottle of distilled water ahead of the unknown. But color is a different matter. Yellows or blues, for instance, may give greens of difficult matching qualities while the acid may discharge the color or at least weaken it to the point where a match can no longer be made with the standard. This difficulty may be minimized by adding 10 per cent HCl in equivalent quantities to the orthotolidine to the compensating bottle.

This method was used with considerable success at the Saw Mill River Treatment Plant of the Westchester Sanitary District where a nearby run works periodically discharged bright reds, greens, and browns into the sewer a few hundred feet ahead of the plant. Investigation proved that chlorine demands of the dyes were not as high as originally suspected but that the HCl

in the indicator altered the dyes to such a point that the residual could no longer be read.

Davis [15] of the New York State Department and Green [16] have noted that strong daylight will affect the sensitivity of orthotolidine to free chlorine. At Little Falls, N. J., the residual usually remains very consistent day after day. On occasions, however, they would fall very suddenly without warning and for no readily apparent reason. Careful checks demonstrated that the orthotolidine had suddenly lost its sensitivity to free chlorine. It is now standards practice at that plant to renew the test solutions every 6 weeks.

Orthotolidine itself may darken with age. This does not ordinarily alter its sensitivity but does result in a poor looking solution which has the psychological effect of throwing doubt on the test. This is caused by impurities in the salt. A sufficiently pure product to give a water clear solution is now commercially available so that recrystallization does not have to be resorted to.

It seems hardly necessary to speak of time of contact between addition of orthotolidine and time of reading, but I have had so many inquiries along this line that there must still be some question about it. Not more than 10 minutes for chlorine nor more than 20 minutes for chloramines is necessary for production of maximum color. Literally hundreds of samples were run at Bound Brook, N. J., a short time ago to settle this question. Readings were taken at 5 minute intervals and temperatures noted at each reading. This was not a laboratory experiment but was carried out on a natural river water under natural conditions as to weather, temperature, etc. The chlorine and ammonia rations were the only things changed. Very few of the chloramine samples required more than 20 minutes for full production of color, and the majority of the samples containing chlorine alone reached their maximum color intensity within 10 minutes. Practically all of the samples showed a fading of color at the end of 30 minutes.

Unless a water is severely polluted with sewage or industrial waste, the yellow color of chlorinated orthotolidine will usually last for at least 30 minutes unless exposed to direct sunlight. In sewage work, however, the color may flash up to a maximum within 5 minutes and then fade rapidly. Under such circumstances no time should be lost in making the determinations, and the maximum color produced in so far as we know will record the actual residual present. The reason for the flash of color and quick fading is probably due to the action of the chlorine on the organic matter which releases fresh reducing matter with the resultant decolorization of the orthotolidine.

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The "Cure" of Leprosy

WE take no exception to the claims of the bacteriologists that when a patient recovers from a disease such as leprosy or tuberculosis it is impossible to prove that the causal organism has been eradicated or that there is no possibility of relapse. That relapses are frequent must be acknowledged by any physician who handles cases of leprosy. But we protest against the weakness of the clinicians who have allowed their bacteriologically-minded brethren to steal from them a perfectly good word, clothe it in the garments of a heretic, and then burn it at the stake.

We maintain that "cure" is a good old word, far older than the science of bacteriology, quite devoid of the meaning that is now sought to attach to it, and not in the least deserving the obloquy into which it has come. Webster, and such other dictionaries as we are able to consult, give us as the meaning of cure: to restore to health. Neither here nor in its cognate use—the cure of souls—is it for a moment suggested that no future fall from health, physical or spiritual, is guaranteed.

It is evident from every possible reference that what cure implies is a restoration to previous functional health, so that the victim is again able to take his place in society as a normal member thereof. Now our bacteriologically minded friends want to give an entirely new meaning to this word, and thanks to the weakness of their clinical brethren they are fast doing it. Cure is a good word, a kindly word, and it deserves no such harsh treatment.

. . . One sometimes wonders whether the fact that the pessimist sees so many fewer cures than the optimist is due not merely to a different, possibly more scientific, attitude of mind but also to the psychological effect that different types of minds have on patients. At any rate, we hereby lodge again the claim of the clinician to the restoration of the word "cure" to its proper significance, and invite our colleagues to find some other word implying that the patients are bacteriologically clean.—James L. Maxwell, Editorial, *Internat. J. Leprosy*, 3, 3:351–352 (July-Sept.), 1935.

Problems in Rural Registration*

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ACCORDING to the census of 1930, 44 per cent of the population of the United States is rural. In fact, 27 of the 48 states contain more than 50 per cent rural population. Therefore, it seems timely that a discussion should be had at this time concerning problems in rural registration especially since it is generally known that registration problems invariably center in the rural areas.

There may be some question about the fitness and capacity of the individual selected to prepare this particular paper, but I guarantee that his state contains all known problems in rural registration—and to a greater extent and in a wider variety than any other state in the Union. For nearly 12 years, I have wrestled with these problems and cudgeled my brain continually for methods of solution. We have managed to stay in the United States Registration Areas for Births and Deaths, which I consider a great feat under the circumstances.

What may be listed as the leading problems in rural registration?

First, and foremost, *illiteracy:*

1. In the general population
2. Among midwives, undertakers, rural doctors and rural registrars

Second, lack of medical attention, lack of funeral service due to poverty.

Third, inaccessibility—poor roads—scattered population.

Fourth, unreasonable laws and regulations.

ILLITERACY IN THE GENERAL POPULATION

The census of 1930 revealed that 4.3 per cent of our population is illiterate, and that the illiteracy percentage among the rural population is practically twice the figure prevailing in the urban sections. Unfortunately, we find most of the illiteracy banked in certain geographical divisions, namely, the South Atlantic, the East South Central, and the West South Central, all comprising 17 states.

Among these states, however, we find a comparative minimum of this condition in Delaware, Maryland, District of Columbia, West Virginia, and Oklahoma. On the other hand, a high percentage of illiteracy is recorded for 2 mountain states, New Mexico, and Arizona.

In the geographical divisions just mentioned, the census shows that the percentage of illiteracy among native born whites is 3.7, 5.0, and 2.6, respectively; whereas illiteracy among the Negroes, who constitute a large proportion of the population, is 19.7 per cent, 22.0 per cent, and 17.0 per cent. In the States of Arizona and New Mexico the high percentages of illiteracy are due to the Mexican and Indian components of their population. In Texas the census takers found a

* Read before the Vital Statistics Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 8, 1935.

million and a half Mexicans and Negroes—over 25 per cent of the total population of the state.

Mississippi is classed as 83.1 per cent rural, being exceeded only by North Dakota as a rural state. A fraction over 50 per cent of the population of Mississippi consists of Negroes, and 88 per cent of these are rural. The rural Negro in the United States was credited with 22.4 per cent illiteracy in 1930.

ILLITERACY AMONG SPECIAL CLASSES CONCERNED WITH REGISTRATION

1. *The Midwives*—In Mississippi there are nearly 3,000 so-called midwives, most of whom can neither read nor write. They attend 50 per cent of the births in the state; and of course a great majority of these births occur in the rural areas. If this state of affairs does not constitute a problem in rural registration, what does it constitute? Fifteen or 20 other states in the Union are faced with the same situation in lesser degrees.

2. *Undertakers*—The country undertaker usually develops more or less by accident. He is ordinarily a furniture or hardware dealer to begin with; then he puts in a small stock of coffins; finally, he buys a second-hand hearse and begins to bury the dead. He is afflicted with ruralitis anyway, and it is hard to inculcate in his mind the importance of registering deaths.

3. *Doctors*—The rural doctor as a rule means well, and many of them are well educated and up-to-date, but it is a fact that most of the old-timers and uneducated groups cling to the rural districts from necessity as well as choice. In the early days of registration they were principally the group that scoffed at birth registration as a piece of foolishness. Going further than this, I am convinced that few professors of obstetrics in the United States teach medical students the necessity and importance of birth registration.

4. *Local Registrars*—Our rural registrars can be blamed for many shortcomings. The majority of them are not systematic. They lose many birth and death records that have been entrusted to them for mailing to the central office. Many of my local registrars are downright ignorant, and I am confident that all of them in other states are not college graduates.

LACK OF MEDICAL ATTENTION—LACK OF FUNERAL SERVICE—DUE TO POVERTY

Possibly we are all aware of the surprise exhibited by physicians and health officials at one result of the recent depression.

When money became scarce back in 1931 and health appropriations were cut in half everywhere, we all put forth our big argument that people would die like sheep, and epidemics would stalk throughout the land. The truth of the matter is during the depression we had the lowest death rates ever reached.

But, lack of medical attention, however it may affect the death rate, does interfere severely with rural birth and death registration and with tabulations on causes of death. In certain sections, from 10 to 15 per cent of deaths occur without medical attention, and these do not include sudden deaths. Also, thousands upon thousands of births occur without medical attendants.

One of the ardent desires of my life is to see the day come when every man, woman, and child will be able to secure adequate medical, surgical, and hospital service when necessary. Lay literature and medical literature have teemed with articles on this absorbing theme for the past 3 years. Very few advocate State Medicine. I am not advocating State Medicine. In my state almost any humble Negro or

humble white man or any member of his family, can be buried decently, and how? Just by paying $1 a month for the whole family into the treasury of a burial association. The humble citizen saves money—the burial association makes money. My own family consisting of myself, wife, and numerous children, belong to a burial association run by a first-class undertaker, and I pay only $1 a month.

The president of an eastern medical university, in addressing a gathering of the American College of Surgeons, made the following suggestions for universal medical attention.

1. That those in easy circumstances should take care of their own medical and surgical service.
2. That the great middle class should pay associational dues to guarantee them proper protection.
3. That the indigent portions of the population should be treated at public expense.

I believe if you were to search the world over, you could not devise a more sensible scheme for rendering universal medical service, and it does not mean State Medicine.

There would result a marvelous improvement in rural birth and death statistics if there were medical attendants in all cases.

I have already more or less appraised the rural undertaker, but it is a fact that hundreds of deaths occur in certain sections of the United States wherein no undertaker whatever officiates. A large percentage of these deceased persons do not even enjoy the luxury of taking their final repose in manufactured coffins.

INACCESSIBILITY—POOR ROADS—SCATTERED POPULATION

Poor roads and inaccessibility of homes constitute major difficulties in successful registration in the rural areas. However, during the past 10 years rural roads have been vastly improved, even in Mississippi. Doctors think nothing of making calls 25 miles away, and undertakers travel over 100 miles in burying the dead.

The density of population in the states varies from 0.8 per square mile in Nevada to 644.3 in Rhode Island, and even to 7,852.7 in the District of Columbia, which of course means the City of Washington. Mississippi's density is 43.4 as compared to 41.3, the national average.

UNREASONABLE LAWS AND REGULATIONS

Most of our registration laws were passed in a different age from that in which we live today. In fact, anyone who is now as old as 40 has lived in two distinct eras of the world's history. Therefore, if our registration laws were founded on conditions existing 25 years ago, and have not been revised to fit modern circumstances, we are groping in the dark, particularly in rural sections.

It is not my purpose to criticise the laws and regulations that govern registration in any other state. However, I shall detail two radical departures made in Mississippi from the uniform registration law and will ask you to be the judges as to the wisdom of such changes.

1. Nearly 2 years ago we suspended the burial permit, except for deaths occurring in towns of 1,000 or more population and except for bodies shipped into other states.
2. During the present year, we are consolidating districts to the extent that in over half of our 82 counties we have only 1 registrar to the county.

Marked improvement in registration of births and deaths has been noted in our state as a result of these departures from the time-worn requirements that have been binding for nearly a quarter of a century. These changes have been made to fit modern conditions.

We feel that there would be just as much reason to require a physician to make out a birth certificate and file it and get a permit to attend a labor case as there is justification in requiring an undertaker to make out a death certificate; file it; and obtain a burial permit. Why should state boards of health take it upon themselves to give permits for burial of the dead? * If there is any suggestion of foul play, then the registrar refers the case to the coroner. We are not crime officials. Requiring a permit in rural areas in this day and time works an unnecessary hardship on the undertaker and the family. The family may be 20 miles from the undertaker. The doctor who treated the case may live 15 or 20 miles away, and the registrar may live 10 miles in another direction. The registrar or the doctor, or both, may not be at home when the undertaker calls. In such a case, the undertaker must travel nearly 75 miles just to file a completed certificate and obtain a permit.

We give our undertakers 5 days from date of death to file the death certificate. Our rural certificates are now in better shape and a greater percentage are being filed than heretofore.

As stated elsewhere, doctors now travel many miles in their practice, and it is nothing unusual for undertakers to transport the dead 100 miles or more; so we have become convinced that 1 registrar in a county simplifies registration for that political division, and lessens the work of the clerk or clerks in the central office who keep accounts with the registrars. The monthly reports of the county registrars in Mississippi have exceeded our expectations.

As proof of the fact that suspending the burial permit in Mississippi, except for deaths in towns of 1,000 or more people, has benefitted registration, our figures show that for the year 1934, the first year the permit was suspended, we had an increase of 1.4 per cent regular death certificates—that is, certificates filed on time. Also, we had a 9 per cent decrease in delayed filing of death certificates. This includes not only certificates filed by undertakers, but by families of deceased persons where no undertakers were employed. In fact, a large percentage of burials are done in Mississippi without the assistance of undertakers. The total number of death certificates filed in Mississippi during 1933, the last year that permits were in force, was 21,617; the total filed during 1934, the first year the burial permit was suspended, was 21,786.

Now that the leading obstacles to good registration in rural areas have been considered, you may very naturally expect some recommendations for their removal, or at least for their amelioration.

It is an undisputed fact that ignorance is the greatest handicap to progress; but I am glad to state that illiteracy is gradually dissipating, as shown by official figures. In all classes of our population the percentage reduced from 6.0 to 4.3 between 1920 and 1930. The percentage in the white race decreased from 4.0 to 2.7, and illiteracy in the Negro race came down from 22.9 to 16.3 per cent.

Furthermore, one must study and plan various and sundry schemes for appealing to the less educated. High sounding phrases and arguments on the value of statistics do not get very far with the illiterate. The greatest educational force we have had on the value

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* Although the Council of the Vital Statistics Section expressed its disagreement with the view that the use of the burial certificate was unjustified, publication of this paper was approved by the Council for purposes of discussion.

In a supplementary letter, the author writes: "I realize that in a majority of states, it would not be best to suspend the burial certificate. It may not be the best policy in some of the southern states."

of registration is government compensation to so-called disabled veterans.

Another potent aid to registration is the necessity of proving the age of a child first entering school. While this is now required in many localities, each state should make such proof mandatory. A photostat of the birth certificate, or the Census Bureau Certificate, or other certificate of birth registration has great educational value, especially in the rural areas.

The matter of inaccessibility of rural homes is being solved by highway improvement and the general use of fast moving vehicles. In addition, we observe that this class of population is being reached through wider circulation of the daily press and through consolidation of public schools.

Our local registrar fee law was amended a few years ago so as to reward registrars for prompt reporting. Any registrar in Mississippi who does not live in a town of 5,000 or more population receives $.40 for each birth and death certificate filed on time, and only $.25 for each delayed certificate, whether the delay is the fault of the registrar or of some other person. This change in the fee law proved to be a wonderful stimulus for prompt registration in the rural areas.

I should not like to close without calling attention to the fact that every state registration department should have a field man. Unfortunately, I cannot say that I have one, but I have had one occasionally, and do know the great value of such an employee. There is no doubt but that a certain amount of prosecution is essential in this work. The field man is the proper individual to check the work and to prosecute where such a proceeding would obtain the best result.

Dr. J. G. FitzGerald to Make International Study of Methods of Teaching Preventive Medicine

DR. J. G. FitzGerald, Dean of the Faculty of Medicine, Director of the School of Hygiene and of the Connaught Laboratories, University of Toronto, has been invited by the Rockefeller Foundation to make a study of the methods at present employed in the teaching of Preventive Medicine to undergraduates in medical schools.

It is anticipated that the study will occupy a period of 1 year commencing September 15, 1936. Dr. Charles Edward Smith of the Stanford University Medical School, San Francisco, will assist in the undertaking. University Medical Schools in the United States and Canada, the British Isles, and in European countries will be visited in the course of the survey.

Dr. FitzGerald is to resign as Dean of the Faculty of Medicine, University of Toronto, June 30 next. He will be given leave of absence by the Governors of the university for the necessary period and will, it is expected, return to the University of Toronto in September, 1937, as Director of the School of Hygiene and of Connaught Laboratories.

Treatment of Undulant Fever*

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THIS report is a summary of results obtained from the treatment of 100 cases of undulant fever with Brucellin. This disease has a tendency to become chronic following the acute stage, so that the chronic phase may be the more serious condition from a standpoint of the general health of the patient. It was therefore necessary to obtain data on the actual effectiveness of the therapeutic agent in bringing about complete recovery rather than to appraise it on the basis of a rapid termination of the acute stage. A large percentage of the cases were checked many months after cessation of the specific treatment.

Clinical diagnosis of undulant fever is not easy particularly in the chronic type and in children. The presence of specific agglutinins in the blood may furnish confirmatory evidence but cannot be relied upon, since the blood of many individuals shows Brucella agglutinins, sometimes in high titer, and a negative test does not always exclude this infection. A further aid is the intradermal test with Brucella allergin. This test does not distinguish between sensitization as the result of a previous infection and infection at the time the test is made. A new preparation which is a nucleoprotein suspensoid known as "Brucin" is now being studied. Further laboratory evidence may be obtained by measuring the Brucella opsono-cytophagic power of the blood. This test may also be used as an index of recovery from infection. Of the 100 cases studied the agglutinin titer was either negative or less than 1 to 50 in 33 patients of whom 22 were children under 11 years. In 85 cases, an attempt was made to obtain a blood culture. This was successful in 16 instances. Of the 16 cultures, 7 were *Br. abortus*, 5 were *Br. suis* and 4 were *Br. melitensis*.

It is difficult to estimate the value of any therapeutic agent for undulant fever. In many cases symptoms are of short duration; or if the disease is recognized early and the patient put to bed, uneventful recovery may follow in a few weeks. Recovery after specific treatment from an acute attack is not comparable to recovery from the distinctly different chronic disease. Only general data are presented for this series of cases.

In 70 cases the duration of symptoms before treatment with Brucellin was less than 121 days. Fifty-one, or 73 per cent, recovered within 22 days after the first injection, 18 or 26.1 per cent required more than 22 days for recovery, and 1 or 1.4 per cent failed to respond. In 30 cases the duration of symptoms before treatment was more than 121 days. In this group 17, or 56.6 per cent, recovered within 22 days after the first injection, 10, or 33.3 per cent, required more than 22 days for recovery, 3 failed to re-

* Abstract of a paper read before the Laboratory Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 10, 1935.

spond, 2 of these cases terminating fatally.

If one excludes the 6 cases that failed to respond to treatment and the 2 that succumbed, it will be found that the average duration of illness per case before treatment was 159.3 days. The average duration of illness per case after treatment was begun was 18.3 days.

It is believed that an intradermal allergic test made with standardized allergin and a proved opsono-cytophagic test are indispensable aids to diagnosis and that the latter test is valuable for determining recovery.

Standardization and Application of Different Preparations of Diphtheria Toxoid*

OLGA R. POVITZKY, M.D., DR.P.H.

Bureau of Laboratories, Department of Health, New York, N. Y.

A VARIETY of media is used for the preparation of diphtheria toxin. In the Research Laboratory of the New York City Department of Health a powdered, purified extract of fresh veal and beef heart muscle, with 2 per cent proteose peptone, 0.5 per cent salt, 1 per cent sodium acetate, and 0.3 per cent maltose is used for making toxins for immunizing horses, unmodified toxoids, and toxoid flocculi extracts. A medium prepared by boiling fresh veal with 0.5 per cent glacial acetic acid in distilled water, with subsequent additions of proteose peptone, salt and maltose is considered more satisfactory for the preparation of toxoid alum precipitate since this precipitate is more homogeneous and smoother than that made from the first mentioned medium. Irrespective of the medium used, the toxins formed are alike in kind. When sufficiently potent they can be converted in toxoids by the addition of 0.4 to 0.5 per cent of a 37 per cent formaldehyde solution, followed by incubations at 38°–40° C. for 4 to 6 weeks.

Since the introduction of diphtheria toxoid for immunization, numerous attempts have been made to enhance its potency with the object of decreasing the dosage, using 1 or 2 in place of 3 doses, and eliminating both systemic and local reactions. The result is the toxoid alum precipitate. In older children and in adults severe reactions have been obtained, so that the New York City Department of Health uses this only for babies and children of preschool age. For school children crude toxoid in 2 doses is used. Reactions may be practically eliminated by the use of toxoid antitoxin flocculi extract, but many more flocculating units are required for antibody production than is true for the toxoid alum precipitate, probably due to the too rapid absorption of the extract. The toxoid antitoxin flocculi extract is used in adults only.

Unmodified toxoids, properly stored and preserved have an immunizing value proportional to the flocculating units. When phenol is used as a preservative, however, the antigenic value decreases

* Abstract of a paper read before the Laboratory Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 8, 1935.

although the number of flocculating units remains the same. In general, the Ramon flocculation test is sufficient for initial titration of toxoids and is being used not only for titrating toxins, toxoids, and their derivatives, but also for crude diphtheria antitoxins. Discrepancies between this and the more laborious guinea pig method have been encountered in testing concentrated and purified toxoids and antitoxins, but some of these may be overcome by careful attention to the technic of the flocculation test.

Office of Public Health Education Established

THE U. S. Public Health Service has announced the establishment of the Office of Public Health Education. It is under the care of Assistant Surgeon General L. H. Thompson, Chief of the Division of Scientific Research. The purpose of this new Division is to carry out certain experimental studies in health education.

Its initial activities are: the training and instruction of young commissioned officers of the Service; special instruction for educators, health officers, and sanitarians from state health departments or from foreign countries; to make studies of educational methods employed in health agencies and other fields of education; studies in mass adult education through the use of the radio; making permanent records of available material; and the issuance of a bulletin to carry current health information primarily for the personnel of the Service.

The bulletin has been called "The Health Officer," the first issue of which appeared in May, 1936, and the second in June. It is intended that a monthly digest of current public health education be issued. The first two issues are pleasing and instructive. They contain a number of well written reviews of books.

We cannot help thinking that our government should be able to put out a better looking bulletin. The two issues received are of different sizes, one with a colored cover, and one in black and white. One is apparently mimeographed and the other multigraphed. At any rate, both of them are produced by some process apart from printing. Some of the reviews of books are signed and some of them have only initials. We believe that the value of a review depends largely on who wrote it.

We wish the new department all success, and the name of its Director assures us of its efficiency. The bulletin is also useful, but we hope that it will improve in its appearance.

EDITORIAL SECTION

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.

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IMMUNIZATION AGAINST DIPHTHERIA

EXCEPTING smallpox vaccination, perhaps our most important success in the prevention of disease by specific immunization has been with respect to diphtheria. No measure of this class, other than smallpox vaccination, has been more generally accepted or has resulted in a larger measure of success in the prevention of illness and death.

Immunization procedures against diphtheria have been singularly free from undesirable complications, when one takes into consideration the number of immunizations which have been done. This is particularly true of diphtheria toxoid, the agent now most extensively employed, whether given as the plain product or in the modified form usually spoken of as alum precipitated toxoid. The practical application of the latter in this country we owe largely to the genius of the late L. C. Havens, Director of the State Laboratory of Alabama. In the earlier stages of the use of this preparation a considerable number of local abscesses followed the injection of certain lots, but so far as known, no serious permanent injury has resulted. A very small proportion of abscesses continue to follow the use of certain batches, and research workers engaged in the testing of this preparation have not devised thus far a wholly satisfactory means for detecting by laboratory tests those batches likely to be followed by abscess formation, if indeed these undesirable local sequelae are actually due to any inherent property of certain preparations of alum precipitated toxoid.

There was a long interval between the establishment of the theoretical basis for immunization against diphtheria and the practical application of the procedure, but once the latter had been undertaken, thanks largely to the inspiring leadership of William H. Park, health officers and physicians rapidly extended its use, so that now a very considerable proportion of children in the period of greatest susceptibility to diphtheria have been and are being immunized.

The question as to which of the two preparations should be used, the plain toxoid or the alum precipitated toxoid, has been an open question for some years, sometimes bordering on the nature of a controversy; and it is feared that too often sight of the merits of the issue has been lost in efforts of proponents to popularize one or the other of the preparations. Generally speaking, European and Canadian workers have adhered to the use of the plain toxoid, being influenced doubtless by the high authority of Ramon. The plain toxoid has been largely replaced by the alum precipitated material in the United States, but nowhere else in the world has the latter made great headway.

Perhaps one of the reasons for the controversial situation arises from the fact that there is a lack of a generally accepted accurate method of standardization of the potency of any of the diphtheria prophylactics. While we have methods for evaluating their activity, they are by no means as exact as those for evaluating the potency of diphtheria antitoxin. Then, too, there is no uniformly accepted procedure as to the size and number of doses of the material used or as to the spacing between doses when more than one dose is given. In practical application the health officer would do well to bear in mind the particular age group in which susceptibility to diphtheria is greatest. Generally speaking, this is the group between the ages of 2 and 7. Perhaps it would be a good rule for ordinary public health practice, including public school work, to say that it is hardly profitable to immunize against diphtheria after 10 years of age.

Unquestionably the most important problem has been to secure immunization of the preschool child. Different health authorities have approached the problem in various ways. In one large city the follow-up based on birth records is so thorough that it is an exceptional child which does not have a diphtheria prophylactic before the age of 2 years. In many communities it is customary to leave the interests of the preschool child largely to the family physician, who it is feared in many cases has been rather negligent in failing to recommend this valuable life-saving procedure to his clientele.

Perhaps one of the most important problems is the degree and duration of the immunity produced by diphtheria prophylaxis. An ideal prophylactic would be one conferring an immunity in a large proportion of children lasting until natural immunity has developed. Few groups have been observed over a long enough time, and with sufficient care, to enable us to determine to what extent the various prophylactics have met this criterion. Obviously this is to a considerable extent the essential point of the whole program.

An outstanding variation in actual practice is with respect to the utilization of the Schick test for the detection of susceptibles and for the determination of the effectiveness of the immunization procedure. Although the Schick test is accepted as a practical means of measuring results in large groups of individuals, it is now recognized that it is not an infallible indication of the immunity status in the individual case. The preliminary Schick test has been abandoned generally in the younger age groups, but we see no justification for failing to do Schick testing after the injections have been given and a sufficient time allowed to elapse for the development of immunity. In some communities there has been a considerable degree of disappointment and uncertainty as to where the fault lay when diphtheria has attacked a fairly large number of children thought to be immune by reason of a series of inoculations, but not subjected to the Schick test after completion of the procedure.

THE LABORATORY SECTION

ORGANIZED in 1899 as "The Laboratory Section of Bacteriology and Chemistry" under the chairmanship of W. H. Welch, with Wyatt Johnson as the guiding genius, the Laboratory Section has been active throughout the 36 years of its existence, and never more so than at present. To many members of the Association, "Laboratory Section" and "Standard Methods" are essentially synonymous, and it is quite true that the major interim interests and activities have been centered about the formulation of procedures for use in public health laboratories. Little attempt has been made to interpret the results obtained by these laboratory methods because the Section has felt that so many factors other than laboratory data are involved that the formulation of "standards" would not only be difficult but unwise.

The oldest of the laboratory procedures is *Standard Methods for the Examination of Water and Sewage,* now in its 8th edition. Chemical, microscopical, and bacteriological methods are included, for potable waters, sewages and effluents, streams, industrial wastes, and boiler waters. It is now a joint publication of our Association and the American Water Works Association, but a number of other national societies have coöperated, as well as many individuals. It is the hope of the Section that this manual will always represent the best American practice, and to this end a standing committee is continuously at work on the preparation of new editions. The methods are regarded as authoritative and intended for the guidance of properly equipped laboratory workers rather than for those inexperienced in chemistry or bacteriology. The book is not to be regarded as a substitute for adequate professional training.

Standard Methods of Milk Analysis has gone through 6 editions and the 7th is in preparation. These methods have the same status in the milk laboratory as the water methods have in the water laboratory. The Laboratory Section has been concerned chiefly with the bacteriological examination, since methods for chemical examination have been so well formulated by the Association of Official Agricultural Chemists which are included in our volume. It is proposed to extend the usefulness of *Standard Methods of Milk Analysis* to the more general field of dairy products.

At various times the Section has proposed other standard laboratory procedures, such as those for examination of disinfectants, air, or oysters. The formulation of methods for testing air has been transferred to the Industrial Hygiene Section, those relating to disinfectants have been withdrawn, but those for the examination of oysters and other shellfish are now being revised. In this, as in many reports submitted by the Laboratory Section, representatives of other Sections serve as members of the committee and are of great aid to those working, perhaps at times, too closely in the laboratory.

The success of "standard methods" in certain special interests of the public health laboratory has resulted in an extension of activities to include diagnostic methods ordinarily regarded as belonging to such laboratories. For 2 years a large committee has been at work on these. This is not really a new departure, since the Section has, for a number of years, discussed a series of able reports on the Wassermann technic and finally adopted a standard procedure. Reports have already been received dealing with such diagnostic methods as those for amebic dysentery, enteric fevers, undulant fever, meningitis, whooping cough, tuberculosis, and streptococcus infections. We hope to gather in a single volume

the most frequently used procedures and to publish them in such a form that new methods can be easily added and old ones brought up to date.

With other Sections of our Association and other organizations, the Laboratory Section has coöperated by appointing representatives familiar with the particular problems involved—for example: with Committees on Milk Pasteurization, Swimming Pools and Bathing Places, Waterways Pollution, Biological Stains, Bacteriological Examination of Foods.

With increasing and widening interests of the Section, it became evident that some coördinating group was desirable to systematize these activities. A Coördinating Committee was appointed to have general charge of all committees interested in the various laboratory procedures for which standardized methods are desirable, and to pass upon the procedures before their submission to the Section for approval. At present this committee consists of 5 members, of whom 1 is the Secretary of the Section; but flexibility in the set-up allows for expansion when needed. A recent proposal has been for a committee to consider methods employed in the care and use of laboratory animals. The various committees dealing with standard methods are appointed by the Coördinating Committee and consist of chairmen and referees on the various topics in which the committee is interested. This scheme has been operating satisfactorily for 2 years.

The various Section activities, combined with basic responsibility for the program of the Annual Meeting has thrown a burden on the office of the Secretary of the Section greater than was ever intended, and it is only a question of time before his duties will be too heavy to be handled by a busy man as a side issue to this regular occupation. Although the chairman and councilors have coöperated in planning the Annual Meeting, the bulk of the responsibility has fallen on the Secretary. The Laboratory Section can well be proud of the increasing number of papers submitted and the increased attendance during the past several years. The variety of subjects presented has been rather great, and ranging through the preparation and standardization of laboratory reagents and biological products, discussions of new laboratory procedures applicable to public health problems and the use of biological products in immunization, to reports of laboratory studies on the cause of diseases.

With no intention of over-emphasizing the importance of the laboratory, it must be stated that much of the work of a well organized health department is dependent fundamentally on its laboratory. The epidemiologist, the sanitary engineer, the school physician, the nurse, and the various clinics not only can utilize but need the laboratory, and it is the function of the Laboratory Section to see that efficient service is rendered.

In August Journal

Community Public Health Nursing in the Philippine Islands—*George C. Dunham, M.D.*

Lead Pipes as a Source of Lead in Drinking Water—*G. N. Quam and Arthur Klein*

Administrative Practice in the West—*J. Rosslyn Earp*

PUBLIC HEALTH EDUCATION*

Where Is the Big Bad Wolf?—The big bad wolf, public opinion, who so recently has had press and radio cowed at the very thought of naming "social diseases" by their rightful names, seems to have vanished from most communities. Even as a flapping scarecrow to frighten off insistent health workers fewer and fewer editors and broadcasters will continue to claim protection against stupid readers and listeners.

Departmental Health Education Adviser — Department of Health, Seattle, Wash., has a Health Education Adviser. The bearer of the title, Dr. A. S. Baker, sent the following answer to a question as to the nature of his job:

> This office is quite new, having been in existence only about a year. The job is, briefly, to build up a public health library, starting with a room full of very old volumes, pamphlets, etc., answer correspondence from the public with reference to health matters, operate a mimeograph printing outfit, write up and broadcast radio talks or invite others to do so, take care of press information, check any health information matter before issue and generally correlate health education material issuing from the several divisions of the department.

What Has Been Accomplished?—A newspaper clipping is headed: Advertisers Hail Truth Movement. Celebrate 25th Anniversary of Campaign to Wipe Out Fraudulent Practices.

The accompanying note from the fellow worker who sent us the clipping reads:

> I would be glad to know how far the campaign for Truth in Advertising has really proved effective. Judging from the advertisements for quack medicines that I see in some papers, there has been no reduction in that kind of advertising although it is probable that it does more harm than any other form of advertising.

Taking daily newspapers as a whole there has been a tremendous gain over years gone by, but are there exceptions in your community?

How about the weekly newspapers? Foreign language and other class newspapers?

What have health workers done about it? What might they do about it, directly or indirectly?

An Idea for a Parade?—A city health officer wrote:

> There is to be a parade through the business part of the city with floats depicting the work of the various city departments. We wonder if you have any suggestions as to what subjects to show on a float about the Department of Health.

There have been successful parades for teaching health ideas or giving information, but we have heard of none in which the work of the health department was presented. The ideas we sent in answer to the letter were too feeble to reproduce here.

The time is past for helping the inquirer, but others may benefit from any experiences or suggestions which might be sent to the editor. There is likely to be an increasing number of historical and other public civic events in which the department or other health agency is expected to participate.

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* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

Taken for Granted in Illinois—As reported by B. K. Richardson, Chief of Public Health Instruction, Illinois Department of Health, Springfield:

> Out here on the prairies the "press" picks up on its own initiative, news items concerning venereal diseases and uses the word "syphilis" with no more hesitancy or hedging than it uses the word "tuberculosis" or "diphtheria."
>
> To illustrate: Recently, in a circular to local health officers, the State Department of Public Health commented on the greater reported incidence of syphilis this year as compared with last. Although not released as a news item, the Associated Press picked up the information and used it as a wire story.
>
> The leading down-state newspapers as well as the *St. Louis Post-Dispatch* carried the story. The *Alton Telegraph* and the *Cairo Citizen* based editorials on it. I heard a preacher in one of the leading Springfield churches refer to the story from his pulpit, using the word syphilis.
>
> Whenever the subject is pertinent to the discussion, the word syphilis is used with no hesitancy by members of the State Department of Public Health in radio broadcasts given over various Illinois stations. No objection whatever has ever been voiced by the studio managers.

Enclosed with the above was a mimeographed memorandum addressed "To Local Health Officers Only" which emphasized the current situation in the state. Also a photostat sheet reproduces 5 news clippings and one editorial in all of which syphilis was mentioned in headline or text.

Health Promotion Through Education—Under this title Dr. Iago Galdston addressed the West Virginia Health Conference. Dr. Galdston urged:

> We must reshift our emphasis from man's environment and its inimical elements, to man himself, to his habits, to his practices, to his personal hygiene—we must become teachers again, to teach man how to live.
>
> Health education in America is rooted in prohibitions and taboos, but we must abandon the technic of taboo and cultivate that of affirmation.

He sketched the integration of health education in the activities of the private medical practitioner, the voluntary health organization, and the public health organizations.

Address the author at 2 East 103d St., New York, N. Y., for copy of the reprint.

Why Memorize a Broadcast?—In June, 1936, *Journal,* under "The Martin Family Broadcasts" we copied the interesting and practical material prepared by Dr. and Mrs. Bauer for *Hygeia* concerning the series of episodes which will appear in that magazine.

We wish to question the suggestions for reproducing the episodes in the form of "make believe" broadcasts. Our suggestion is that the stage be not darkened, and that the lines be not memorized for presentation without script in hand. The process of broadcasting continues to fascinate many people. And the simulation of broadcasting carries over some of that interest. And the use of manuscript by the cast behind a real or imitation microphone does away with many problems of actors and acting. All depends upon the rendering of the lines, with attention to acting only as certain of the cast may need the dramatic action to enable them to give the lines effectively. Thus production is simplified, and the audience gets something of the studio atmosphere.

The statement from *Hygeia* that any medical or health organization "is granted permission to produce this material, provided no admission charge is made" might be amplified. On application to the authors, 535 North Dearborn St., Chicago, Ill., permission will be given for paid admission on a modest royalty basis. *We hope that some health groups will explore the possibility of giving one or more of the episodes with paid admissions.* Success in getting a paid audience for health education material would be a

real achievement, and a distinct advance in getting attention for health messages. Is it possible that we are giving away too much or, rather, that there are groups which would respond to projects which called for cash expenditure by the beneficiaries?

Get some Junior League or other group to put on a paid health broadcast?

Our Neighbors to the South—Always we have been delighted to show at the Annual Meeting of the American Public Health Association specimens of health education material from our members and readers in other countries.

This year, meeting in New Orleans, it would be especially fitting to have considerable representation of health education materials of all types from national and local health agencies in all the countries around the Gulf of Mexico and further south.

Posters for hanging, small items mounted in a portfolio or scrapbook, larger pamphlets and reports to place on a table—all could be used to advantage.

Later an address for sending such material direct to New Orleans will be supplied. In the meantime please write to the editor of this department of the *Journal* who is chairman of the health education headquarters.

We hope that brief annotations in English will be supplied because unhappily so few health workers in the United States and Canada can read any of the Latin American languages.

To Our Readers in All Lands—Our major group of readers, in Canada and the United States, have few opportunities for learning about the health education materials and methods of other countries. The editor of this department of the *Journal* is a volunteer not on the staff of the A.P.H.A., and is not in a position to write personally to our readers around the world to request their coöperation. So please take this as a formal request and a cordial invitation to send samples of your materials for educating the public, together with some paragraphs telling in simple manner the methods you follow.

An added favor, please! If the material comes from a non-English speaking country will you please send brief notes explaining the nature of the material and the nature of the health message it carries. And kindly get your brief manuscripts put into English for the sake of the poor editor who may find even greater difficulty in getting translations done.

Also please note what we say elsewhere to "Our Neighbors to the South" and accept it as an invitation to readers in any land. If you issue a periodical could you extend these invitations to your readers?

The Road of Life—Recently the Seattle Department of Health responded to one of those short notice requests (or demands) for a display in connection with a meeting. Dr. A. S. Baker reports what they did about it:

> We made a very good picture on cardboard with cut-out figures and water colors, using one of the members of our staff to do the work. This was hung on a wall over a table on which a supply of pamphlets was placed.
>
> The picture was of a hill upon which was shown life's road. Upon this road the cut-out figures were placed: a baby and, in order, a preschool child, a school child, an adolescent, a young adult, an adult at about 45 years, and an elderly person obviously in good health.
>
> Along the road was placed the "Fence of Health Protection" labeled opposite each figure in the order given above, "Proper Diet," "Diphtheria Protection by Toxoid," "Smallpox Protection by Vaccination," "Typhoid Protection by Inoculation," "Regular Physical Examinations," "Recreation," "Rest."

In the sky above the hill was printed "Protection of Health on the Road of Life."

This "Road of Life" guarded by the "Fence of Health Protection," skirted a precipice at the bottom of which was a swamp. For a very quickly gotten together thing, it seemed quite effective.

In the Philippines—Save for the illustrations *The Health Messenger* might well be issued as a popular health monthly by any state in the country. But the *Messenger* comes from the Bureau of Health, Department of Public Instruction, Manila, P. I. Miss Josefa Llanes-Escoda is editor and educational secretary of the bureau.

April, 1936, is a "National Hospital Day" number. One page pictures a hospital building, with smaller sketches labeled laboratory, dispensary, personnel, operating room, etc. Text: "These activities cost a great deal of money. Support your hospital." Elsewhere a simple sketch: a dollar in the center; curved lines from the dollar to hand made lettering to read: light 4¢, laundry 4¢, wages 13¢, salaries 31¢, etc. There are no dividing lines in the dollar for the different items. The point is made by the larger numerals for the items in cents.

Miss Llanes-Escoda would appreciate receiving samples of health education material.

A Y.W.C.A. Health Program—What the Public Health Committee of the Central Branch, Y.W.C.A., Chicago, Ill., is trying to do is outlined in *Womans Press*, 600 Lexington Ave., New York, N. Y. June, 1936. *20 cents.*

The committee is "bearing in mind the necessity of concentrating on few topics and reaching more of the membership."

A "study of physical defects and conditions prevalent among women in touch with the Health Education Department" provided the subject matter for the educational program.

Health Education in May, 1936, Journal—For the possible convenience of students and writers, as well as health agency staff members, we review here references to be found in the May, 1936, issue of the *Journal* which have a bearing on health education or which may have special value to workers in health education.

In "Child Health and the Elementary School," by Phair, note the situation of "the average child" as stated in last paragraph, page 455, and the whole of page 456.

In "Comparative Value of State Districts and County Districts as the Basis of Local Health Organization," by Godfrey, note two paragraphs on "propaganda" on page 466.

In "Integrating Mental Hygiene," by Patry, note the last paragraph on page 478 which states the necessity for combined professional and community efforts in the successful development of mental health.

On page 479 is announced the request of State and Provincial Health Authorities that the Children's Bureau assume responsibility for the annual "May Day–Child Health Day" which for so many years has been sponsored by the American Child Health Association.

See the symposium on "Consumer Demand for Vital Statistics," by Round, Doull, Eliot, Bolduan, and Thompson, and Thompson (pages 489–505).

Under "Health Code on National Basis" (page 511) the 5th heading is:

Education and publicity . . .

Under "Relationship of the Public Health Nurse to the Part-time Local Health Officer in Communicable Disease Work," by Arnstein, this question is raised:

What responsibility has she in reporting

cases, in selection of cases to be visited in education of the community?

See announcement of *Educational Abstracts* (page 527) which includes a section on "Health and Physical Education."

"New Orleans, The Convention City" (pages 540–545) may help some readers to decide not to miss the October meeting in that city.

Another group of members of the Public Health Education Section is announced on page 549.

"Summer School Courses in Public Health" are listed on pages 552–555.

"Conferences and Dates" are announced on pages 559–560, and "Meetings of Affiliated Societies and A.P.H.A. Branches" on page xii.

Numerous reprints from the *Journal* are listed on page xii.

Health Education in June, 1936, Journal—References of interest to health educators are noted below.

"For an Amended S. 5" (page 585), quoted from *Printer's Ink*, states the case of a group of organizations on the current "Copeland Bill."

"Set-Up and Budget for Public Health Education," by Hiscock (pages 593–596), was one of the important papers presented at Milwaukee.

"Integration of the School Health Program with Community Health Education," by Blanchard (pages 625–628), also comes from the Milwaukee program.

Reports on educational qualifications of engineers and of sanitarians (pages 629–633) are contributions to the study of professional preparation in which health education should have a continuing share.

Most important in this issue of the *Journal* is the editorial on "Work for the Editor" (pages 636–637). Addressed to those who will write papers for the New Orleans meeting, much of the editorial has a bearing on the writing of popular health education material.

"In Books and Reports" see "American Chamber of Horrors" (page 650).

See "For All to Read" under "A Selected Public Health Bibliography With Annotations" (page 653).

"Health Conservation Contests for 1935" are reported on pages 655–656.

Another fine list of new members of the Public Health Education Section is given on page 658.

"Scientific Exhibits in New Orleans" (page 659) is an important announcement.

September 1 is stated as the closing date for acceptance of applications for Fellowship to be acted upon at New Orleans (page 659). The Public Health Education Council would be glad to receive Fellowship applications from a number of the Section's members.

HONORABLE MENTION

To Departamento Nacional de Higiene, Republic of Colombia, Bogota: for an annual report with a 4 page index.

BOOKS AND REPORTS

Why Keep Them Alive?—*By Paul De Kruif, in collaboration with Rhea De Kruif. New York: Harcourt, Brace,* 1936. 293 pp. Price, $3.00.

Here at last is a popular glorification of public health activities. In the course of this fervent treatise, De Kruif devotes much space to the child welfare and antituberculosis work conducted in Detroit under the direction of Health Commissioner Henry F. Vaughan and his able corps of assistants. Other eminent sanitarians, including Drs. W. H. Park, L. I. Dublin, S. McC. Hamill, B. Marquette, H. C. Sherman, and Haven Emerson, also come in for mention in various parts of the book.

The 10 chapters, written in the author's usual ebullient style, but with somewhat more inspiration than usual, present the thesis that many children in this country are underprivileged, malnourished, poverty-stricken, and generally forgotten; that they are worth saving; and that skillful efforts now being undertaken by a group of competent and devoted health workers should be supported and enlarged.

In addition to the chapters on tuberculosis and on child hygiene generally, there is excellent material on nutrition, emphasizing the "rediscovery of milk's amazing array of virtues," and there is a most interesting chapter on the Dionne quintuplets.

This well printed book by a popular writer turned sociologist should be of interest not only to all members of the public health profession, but should yield many useful facts which health workers can employ to advantage in their endeavors to educate an apathetic public, and should aid in awakening the people themselves to a realization of some of the more urgent public health problems. JAMES A. TOBEY

Great Doctors of the Nineteenth Century—*By Sir William Hale-White, M.D. London: Edward Arnold and Co.,* 1935. 325 pp. Price, 15s net ($5.00).

This is not only a delightful book to read, but it tells us of great men with whose history all interested in medicine should be familiar. Most of the great doctors selected are probably well known to the average medical graduate in this country, though it must be confessed that in spite of the influence of Osler, sufficient emphasis is not laid on medical history in our medical colleges. Some names, like those of Jenner, Cooper, Bright, Simpson, Stokes, Manson, Lister, and Ross will be recognized immediately. Some, like Hughlings Jackson, will be known to neurologists. Sir John Simon is probably comparatively little known except to sanitarians. He was Lecturer on Pathology at, and on the surgical staff of, St. Thomas's, but acquired fame as a pioneer in sanitary science.

The author gives a sketch of each man considered before pointing out the work which made him famous.

We do not like to quote the hackneyed phrase, "Lives of great men all remind us," etc., yet there is one feature so outstanding in this book that we cannot refrain from doing so. Many of these great men came from large families, poor in this world's goods, had a severe struggle to obtain

their education and to get started in the profession in which they made such brilliant records. In this there surely is a lesson for many of the young men of the present day in America, who, owing to economic conditions as well as to competition, find it hard to get a start. There are notable instances, rare today—at least in this country—of a freedom from jealousy and an overwhelming desire to see results accomplished rather than to gain credit. This is brought out particularly in the history of Sir Samuel Wilks, who is said to have preferred that Hodgkins be known rather than himself.

In a book of such general excellence, it is hard to select one chapter over another. For readers of this *Journal*, however, we believe that the histories of Edward Jenner, Sir John Simon, Sir Patrick Manson, and Sir Ronald Ross will be of particular interest, though while saying this, it is recognized that the vast majority of those who take up this book will read every chapter, and we are not blind to the fact that the work of Lord Lister in advocating and perfecting antiseptic surgery, for example, has had an enormous influence in promoting the acceptance of the great truths taught by Pasteur which underlie public health of today.

In the days in which these men lived, formal lectures were the rule. Bedside teaching was conducted in a very different manner from that of the present. No one better fitted than the author to write on these great doctors could have been chosen. Many of the men of whom he writes were on the staff of Guy's or St. Thomas's Hospital, to the former of which the author is the consulting physician, and of which he is a distinguished alumnus. He was probably taught by some of the men of whom he writes, or by their former students.

The book is admirably printed and made up. There are very few mistakes, and only one liable to lead to misunderstanding. On page 267, Lister is compared to himself instead of to Liston. The whole book is delightful reading, and we trust that it will increase the love for medical history for which Osler worked so many years and in which he has left in this country some distinguished successors.

MAZŸCK P. RAVENEL

The Art of Leadership—*By Ordway Tead. New York: McGraw-Hill,* 1935. 308 pp. Price, $2.50.

The most successful health officer must be a leader—of his staff, of public health thought in his community and of professional and lay groups in his community with respect to their public health activities. This phase of his activities is not an important part of his training either in schools of public health or schools which prepare for this training. He must depend therefore for the present on such books as this for guidance.

The author performs a useful service in analyzing the art of leadership and pointing out its superiority over bossing as a method of permanent achievement. There is a chapter on conference leadership which should be read by everyone who has occasion to preside over any group meeting of three or more people. That a high degree of physical health is a valuable asset in leadership is implicit in many of the author's statements.

HOMER N. CALVER

Health and Human Progress—*By René Sand. New York: Macmillan.* 278 pp. Price, $3.00.

This is a learned, interesting and stimulating essay on social progress, past, present and future. The author ranges widely in space and time and the title of the book does not adequately describe its scope. His thesis is that medicine—"sociological medicine"—

must save the race. He does not convincingly demonstrate why he elects this particular branch of learning to achieve this noble end, nor why he chooses this designation for the curriculum of improvement. He says,

> Sociological medicine demands the provision, by *collective measures* of favourable labour conditions, good housing, decent wages, generalized insurance, sanitary, technical and educational services, to be completed by the *individualized action* of medical and social case work.

Most of this is "good medicine" but it is better described as social planning or social hygiene, as that term is used in the author's country.

The necessary, important and increasing part which medicine must play in the further social development of the race is discussed thoroughly and intelligently with a background of world-wide knowledge of national medical and social situations. These glimpses of conditions and achievements in many countries alone recommend the book as required reading for students in this field. Much of it will interest the general reader but it is essentially a textbook, and includes a most excellent and lengthy bibliography. The index is not adequate for the wealth of material treated.

There are few men in the world who have had such opportunity for the study of social conditions in all parts of the world as the author. Nevertheless, he tends to confuse medicine in its relation to social progress with the relation of social progress to public health. His preoccupation with the problems of medical relief for the sick poor and sickness insurance tends to crowd out consideration of such fundamental programs as those for water purification, insect eradication, and milk pasteurization, which are so essentially social in their concept and execution, with tremendous influence on the *mass* prevention of disease and therefore proper for prime treatment in a book on health and human progress. Though much space is given to the problems of medical economics in the United States and elsewhere, the rôle of epidemiology in the prevention of crowd disease is not discussed. Snow's classic studies on cholera are not even mentioned. HOMER N. CALVER

Annual Report of the Surgeon General of the Public Health Service of the United States for the Fiscal Year 1935—*Washington: U. S. Government Printing Office*, 1935. 158 pp. Price, $.75.

This report is always of interest. Unfortunately, it is generally many months late. Although it is dated October 15, 1935, it did not come to hand until January, 1936. It concerns the state of public health for the calendar year of 1934.

The death rate for the year was 10.9 per 1,000—0.4 per 1,000 or 3.8 per cent higher than for 1933. It is, however, lower than for any recorded rate before 1932. The birth rate has increased to 17.1 per 1,000 against 16.6 for 1933. This means that there were 93,975 more births for 1934 than for 1933, an increase of 3 per cent. The infant mortality rate is higher than for 1933. In 1934, there were 59.9 deaths under 1 year per 1,000 live births, against 58.2 for 1933. Again, the rate is lower than for any year prior to 1932.

The tuberculosis death rate for 1934 was 56.2 per 100,000, the lowest ever recorded by the Public Health Service. Typhoid fever and diphtheria had exactly the same rate, 3.3 per 100,000.

The outbreak of poliomyelitis in California in 1934 has already been noted. For 1934, there were 6.4 cases of the disease per 100,000 population reported. Late in the fiscal year of 1935, outbreaks occurred in North Carolina and Virginia, which are de-

scribed in full in the *American Journal of Public Health* for February, 1936. In July, 1934, dengue appeared in Florida and spread to Georgia and Alabama, there being 2,005 cases in Florida, 1,962 in Georgia, and 1,072 in Alabama. The actual number of cases must have been tremendously greater, as dengue is very imperfectly reported.

During the year 1934, 775,000 cases of measles were reported, nearly double the number reported in 1933.

One fatal case of plague was reported in Lake County, Ore., and one non-fatal case in Tulare County, Calif. There were found during that year 197 plague-infected ground squirrels and one plague-infected rat in California.

One of the blots on our record is smallpox, 5,371 cases being reported. This, however, is the smallest number since records have been kept, and 10 states have had no cases.

Our maritime quarantine has been very effective. Quarantine officers of the Public Health Service inspected 15,262 vessels and 1,924,556 persons; 12,482 vessels, 544,255 passengers, and 981,361 seamen were inspected upon arrival at continental United States ports. Of a total of 4,081 arriving airplanes, carrying 34,135 persons, only 2,636 airplanes, carrying 30,249 persons, of whom 1,991 were aliens, were accorded the medical inspections required by law; the remaining airplanes arrived at airports of entry at which medical officers of the Public Health Service are not available for duty.

The certification of water supplies for use on railroads, busses, vessels, and airplanes was continued with the assistance of state health agencies, 95 per cent of the listed supplies being inspected and certified; 58 supplies were prohibited, and 401 provisionally certified.

The study of venereal diseases has been carried on and is not very encouraging. During the year, 254,551 new cases of syphilis and 161,810 new cases of gonorrhea were reported. It is estimated that there are 518,000 new cases of syphilis and 1,555,000 of gonorrhea each year.

The report is an interesting review of health conditions in the United States.

MAZŸCK P. RAVENEL

Mouth Hygiene for School Age Children, Rendered by Several Cooperating Agencies in Cleveland During 1935—*By Harris R. C. Wilson, D.D.S. Cleveland, Ohio: Cleveland Board of Education (privately printed),* 1936. 79 pp.

While this is mainly a report of dental services rendered in the Cleveland schools last year, it might well be used as a textbook for public dental health work. No matter how much one may distrust projects aimed at furnishing the greatest amount of essential dentistry at the lowest cost, the recommendations of a man who has supervised the dental care of a half million school children must be given respectful attention.

Dr. Wilson's plan concedes the impossibility of administering complete dental care to all people, and limits its efforts to fillings in vital teeth only, for children. The service is entirely in professional hands. The cost to the patients is within their ability to pay. The compensation of the dentist is reasonable. The value of such a service to a community is inestimable.

It is impossible for a dentist to read this report without being impressed by the soundness of the writer's observations.

C. F. ELZEA

Introduction to Human Parasitology—*By Asa C. Chandler, Ph.D. (5th ed.) New York: Wiley,* 1936. 661 pp. Price, $5.00.

The announcement of a new edition

of this standard book will be greeted by all students of the subject of which it treats.

The 4th edition was rewritten and rearranged owing to the great advances which had been made in the field of parasitology since the third edition. Since that time the pace has been kept up and again the author has found it necessary to rewrite the book. Extensive changes have been made in the chapters or sections dealing with the spirochetes, amebae, malaria, ricketsias, flukes, Strongyloides, filariae and myiasis. In addition the author states that the prolific work of parasitologists of the past 6 years has made it necessary or desirable to make some change on practically every page. The author also points out that it is necessary to revise his statement, made in the 4th edition, that there was no entirely satisfactory modern textbook on medical entomology, and now gives generous credit to the several which are available.

A book which has reached its 5th edition and which has for so many years been regarded as a standard is certainly above the criticism of the average reviewer. This one will doubtless continue to hold the position it has for so long occupied as a standard.

The printing and make-up are good. There are abundant illustrations which are really illustrative and informative. MAZŸCK P. RAVENEL

The Bacteriological Grading of Milk—*By G. S. Wilson, M.D. London: Medical Research Council,* 1935. *Spec. Rep. Series, No. 206.* 392 pp. Price, 7s. 6d. net.

Modern methods for the bacteriological grading of milk to indicate cleanliness and keeping qualities may have to be drastically revised as a result of the facts presented in this somewhat formidable document. As a consequence of investigations extending over 3 years, Professor Wilson and his assistants at the London School of Hygiene and Tropical Medicine conclude that most of the present bacteriological methods used for milk are inaccurate and unsuitable. Thus, they condemn the plate count as guilty of very large experimental errors, and they state that the coliform count gives fictitious and misleading results, except possibly for freshly pasteurized milk. Similarly, the sediment test, the leucocyte count, the H-ion concentration, the titrable acidity, the bromthymol test, the keeping quality test, and the laboratory pasteurization test have all been carefully examined and found defective for routine purposes, although occasionally valuable for special uses.

The Breed smear method receives praise as a practical method for rapid examination of milk, and is declared to deserve greater attention than it now receives, at least in Great Britain. As a replacement for all methods now employed, however, the authors suggest a modified methylene blue reduction test, the modification consisting essentially of half hourly inversion of the tubes to keep the fat and microörganisms in a more or less homogenous dispersion. This test is advocated as a simple, inexpensive procedure, having a small experimental error, and suitable for use by relatively unskilled workers who are dealing with large numbers of samples.

Milk sanitarians and laboratory workers will find this book interesting, valuable, and provocative, especially since the experimental work has been nicely, meticulously, and very capably performed. JAMES A. TOBEY

Convalescent Care in Great Britain—*By Elizabeth Greene Gardiner, Assistant Professor and Supervisor of Medical Social Work, University of Minnesota. Chicago: Chicago Uni-*

versity Press, 1935. 163 pp. Price, $1.50.

This is a book which will interest those called upon to make hospital surveys or studies bearing upon the organized care of the sick.

The convalescent, like the chronic case, frequently has little provision made for him, particularly in the smaller centers. Although general hospitals in 1935 had an average bed occupancy of only 64.3 * per cent, the occupancy is not equally distributed for the whole year, so that at times discharges from hospitals have to be made when the patient still needs convalescent, if not regular, hospital care. Moreover, where convalescent facilities exist, a patient who needs only convalescent care can usually be provided for at much less cost than in a regular hospital. Professor Gardiner has shown how Great Britain compares with the United States in the provision made for this type of patient. Convalescent care in Britain is provided for a larger proportion of hospital cases, the institutions providing the care are, on an average, larger, and on the whole greater pains are taken to see that the institution by location, equipment, and service meets the particular needs of the convalescent case.

A splendid bibliography forms part of the survey. JAMES WALLACE

* *J.A.M.A.*, Mar. 7, 1936.

BOOKS RECEIVED

SOLVING PERSONAL PROBLEMS: A Counseling Manual. By Harrison Sacket Elliott and Grace Loucks Elliott. New York: Holt, 1936. 321 pp. Price, $2.00.

SECURITY AGAINST SICKNESS: A Study of Health Insurance. By I. S. Falk. New York: Doubleday, Doran, 1936. 423 pp. Price, $4.00.

THE BABY AND GROWING CHILD: Feeding and Health Care for Physicians, Mothers and Nurses. By Louis Fischer, M.D. New York: Funk & Wagnalls, 1936. 260 pp., ill. Price, $1.50.

SYPHILIS AND ITS TREATMENT. By William A. Hinton, M.D. (Macmillan Medical Monographs, George R. Minot, M.D., S.D., Editorial Advisor.) New York: Macmillan, 1936. 321 pp. Price, $3.50.

A SURVEY OF PUBLIC HEALTH ACTIVITIES IN HONOLULU, HAWAII, INCLUDING OFFICIAL AND VOLUNTARY AGENCIES. By Ira V. Hiscock, M.A., C.P.H. Chamber of Commerce of Honolulu, Hawaii, 1936. 149 pp., ill.

THE DIABETIC LIFE: Its Control by Diet and Insulin. By R. D. Lawrence, M.A., M.D., F.R.C.P. 9th ed. (London.) Philadelphia: Blakiston's, 1936. 231 pp., 15 ill. Price, $3.00.

HOSPITAL ORGANIZATION AND MANAGEMENT. By Malcolm T. MacEachern, M.D., C.M., D.Sc. Chicago: Physician's Record Co., 1935. 944 pp., ill. Price, $7.50.

HYGIENE AND SANITATION: A Text-Book for Nurses. By George M. Price, M.D. 6th ed., rev. Philadelphia: Lea & Febiger, 1936. 295 pp. Price, $2.25.

FOOD, HEALTH AND INCOME. By John Boyd Orr. New York: Macmillan, 1936. 71 pp., ill. Price, $1.00.

MOUTH HYGIENE FOR SCHOOL AGE CHILDREN, Rendered by Several Coöperating Agencies in Cleveland During 1935. By Harris R. C. Wilson, D.D.S. Privately printed. Cleveland, Ohio: Cleveland Board of Education, 1936. 79 pp.

SOCIAL WORK AS A PROFESSION. By Esther Lucile Brown. 2d ed. New York: Russell Sage Foundation, 1936. 120 pp.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Dietary Fads and Facts—Every health worker who has the least responsibility for influencing public attitudes or ideas should read this excellent article. It is to be hoped that it will be reprinted and made widely available as have earlier health contributions in this remarkable magazine.

ANON. The Wonders of Diet. Fortune. 13, 5:86 (May), 1936.

Preschool Hygiene—A recital of the steps by which Milwaukee progressed from a summer round-up to a year round health program for preschool children.

BRUMBAUGH, E. V. Completing the Child Health Program. Pub. Health Nurs. 28, 5:286 (May), 1936.

Barometric Infant Deaths—Infant mortality rates are a sensitive index of municipal public health *if* the number of births exceeds 500 per year. Less than that number causes too wide a fluctuation. Unusual social and economic conditions may invalidate the index in larger communities.

DERRYBERRY, M., and VAN BUSKIRK, E. The Significance of Infant Mortality Rates. Pub. Health Rep. 51, 18:545 (May 1), 1936.

Proof of the Value of Diphtheria Prophylaxis—Suggesting that the reduction in diphtheria morbidity rates may be due to other factors than our praiseworthy immunization campaigns, the authors call for more studies which will include pre-immunization Schick tests.

LUCIA, E. L., and WELKE, H. F. Trends in the Prevalence of Diphtheria. J. Infect. Dis. 58, 3:306 (May–June), 1936.

Measles Prophylaxis—Reporting the successful use on a county-wide basis of immune globulin in the prevention of measles.

MCGAVRAN, E. G. County-Wide Use of Immune Globulin in the Modification and Prevention of Measles. J.A.M.A. 106, 21: 1781 (May 23), 1936.

Dependent but Well Nourished—Praising the work of relief agencies in preventing malnutrition in school children and adults, the author reviews divers reports on the nutritional status of the American people.

MCLESTER, J. S. Influence of the Depression on the Nutrition of the American People. J.A.M.A. 106, 22:1866 (May 30), 1936.

Hot Weather Hints—Excellent radio advice, but the words are polysyllabic.

OLESEN, R. Care of the Health in Hot Weather. Sci. Month. May, 1936, p. 457.

More Evidence Against Raw Milk—Ice cream containing toxins elaborated by staphylococci originally from a mastitis and transmitted through raw milk was responsible for a food poisoning outbreak.

SHAUGHNESSY, H. J., and GRUBB, T. C. Staphylococcus Food Poisoning. J. Infect. Dis. 58, 3:318 (May–June), 1936.

New Objectives in Public Health—Not sanitation, nor epidemiology, not even the conquest of chronic diseases, but the promotion of health will be the keystone of the administrative program of the future.

WINSLOW, C.-E. A. When Is Public Health? Survey Graphic. June, 1936.

ASSOCIATION NEWS

NEW ORLEANS PROGRAM

THE second meeting of the Program Committee was held in New York on June 5 with representatives of each Section in attendance.

A preliminary scientific program of 2 General Sessions, 3 Special Sessions, 10 Joint Sessions, and 21 individual Section Sessions was approved. A number of special breakfast, luncheon, and dinner meetings was also approved.

The programs will be published in full in the September *Journal*.

Leafing through the tentative outlines submitted to date, a number of important subjects and speakers stand out prominently. Dr. Thomas Parran presents the address of the incoming President. Dr. Henry E. Sigerist, eminent medical historian, is the Banquet speaker. Dr. Thorvald Madsen, Director, State Serum Institute, Copenhagen, Denmark, speaks at the luncheon meeting on Professional Education. The report of the Diphtheria Immunization Committee is presented at another luncheon meeting.

Mental Hygiene is the subject of a Special Session; Mosquito-Borne Diseases another; and Advances in Public Health a third.

The Southern Branch of the Association is sponsoring a dinner session, and the Health Officers are planning another which is entirely a social affair.

There are symposia on syphilis, on food poisoning, on the public health engineer in industrial hygiene and sanitation, on school health education, on eating utensil sanitation, on promotion of birth and death registrations and their interpretation, on milk and dairy products, on enteric fevers, on intestinal parasites, on health publicity and news, on infant and maternal mortality, on municipal engineering problems and activities, and many more.

The papers in the miscellaneous sessions are equally timely and important. Speakers in every case have been selected from among those best equipped to present their material.

The New Orleans program will add to the reputation the Association has been building for itself on the score of distinguished and authoritative Annual Meeting presentations.

Full information about the post-convention tour through Florida to Cuba will be mailed to the membership in the near future.

The Program Committee approved the plans for reception and entertainment submitted by Dr. W. A. McPhaul, State Health Officer of Florida, and Dr. Domingo Ramos, Director of Sanitation, Havana, Cuba.

CLOSING DATE FOR FELLOWSHIP APPLICATIONS

THE Committee on Fellowship and Membership wishes to announce that September 1 is the closing date for accepting Fellowship applications for action at the New Orleans Annual Meeting. Eligible members who desire to apply for Fellowship this year are requested to submit their applications to the committee as much in advance of September 1 as possible.

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Dr. Aristides Paz de Almeida, Praia de Botafogo #516, Rio de Janeiro, Brazil, S. A., Assistant in Public Health Administration, Nacional Health Department

George M. Anderson, M.D., State Capitol, Cheyenne, Wyo., State Health Officer

William F. Bushnell, M.D., Elk Point, S. D., Director, Union County Public Health Unit

Herschel G. Cole, M.D., City Hall, Hammond, Ind., Health Commissioner

George F. Cook, M.D., 4 E. Main St., Plainville, Conn., Public Health Officer

H. R. DuPuy, M.D., County Health Dept., Annapolis, Md., Senior Assistant Deputy State Health Officer

Frank C. Genouese, M.D., Patterson, N. Y., Local Health Officer

Victor F. Krakes, M.D., Keeseville, N. Y., Local Health Officer

George W. Mast, M.D., 1258 Agnes Place, Memphis, Tenn., Student, Vanderbilt University, County Health Officer Appointee in Mississippi

William H. Meyer, M.D., 27 Hooker Ave., Poughkeepsie, N. Y., Health Officer

Arthur J. O'Leary, M.D., 601 E. 167 St., Bronx, N. Y., Assistant Sanitary Superintendent, New York City Dept. of Health

Edgar F. Powell, M.D., Broad St., Fishkill, N. Y., Health Officer

William P. Richardson, M.D., C.P.H., Chapel Hill, N. C., Health Officer, Orange-Person District Health Dept.

Clarence H. Sanford, M.D., Tan Lane, Exeter, N. H., Medical Director, Exeter Academy

Jerome B. Trichter, 10 Monroe St., New York, N. Y., Inspector of Foods, New York City Dept. of Health

Gregory J. Van Beeck, M.D., U. S. Quarantine, Rosebank, S. I., N. Y., Surgeon, U. S. Public Health Service

Laboratory Section

George E. Bliven, 36 St. John St., Goshen, N. Y., Laboratory Director, J. F. DeVine Laboratories, Inc.

William H. Dickinson, City Hospital, Columbus, Ga., City Bacteriologist

Manuel Garcia Hernandez, Phar.D., Calle "G" #6, Vedado, Habana, Cuba, Director, National Laboratory, Instituto Finlay

Maurice C. Hall, Ph.D., D.V.M., National Institute of Health, U. S. Public Health Service, Washington, D. C., Chief, Division of Zoölogy

Lee Howard, M.D., 5 Derenne Apts., Savannah, Ga., Pathologist, charge of Clinical Laboratory, U. S. Marine Hospital

Evelyn Huntington, C.P.H., Harland Road, Norwich, Conn., Student and Assistant in Research

J. D. Kabler, 304 Schweiter Bldg., Wichita, Kans., Director, Wichita Clinical Laboratory

Raymond E. Leach, Box 647, Parsons, Kans., Bacteriologist in charge, District Public Health Laboratory #1

Luis Vargas, M.D., Calle de la Escuela Medico-Militar #20, Mexico City, Mex., Medical Assistant, Hygiene Institute, Dept. of Health

Elizabeth M. Wood, 720 E. Cook St., Santa Maria, Calif., Bacteriologist, Santa Barbara County Health Dept.

Sophia Zurett, 373 Grider St., Buffalo, N. Y., Chief Technician, Buffalo City Hospital

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Joseph B. Irvine, 1426 M. St., N.W., Washington, D. C., Chief, Bureau of Vital Statistics, Health Dept.

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Frank P. Strome, M.D., State Dept. of Health, Harrisburg, Pa., Director, Bureau of Vital Statistics

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Zeda D. Loveless, Davidson County Health Dept., Nashville, Tenn., Staff Nurse

Elsie E. McMahon, R.N., 349–6th, Huron, S. D., School Nurse

Aline S. Mergy, 438 N. 9th St., Terre Haute, Ind., Director, Public Health Nursing Assn.

Mary V. Pagaud, 4400 Dauphine St., Army Base #3, New Orleans, La., Superintendent of Nurses, Child Welfare and Community Health Assn.

Mary L. Railey, 3435 Upperline St., New Orleans, La., Executive Secretary, Child Welfare and Community Health Assn.

Abbie R. Weaver, Capitol, Atlanta, Ga., Nurse, State Dept. of Public Health

Epidemiology Section

Antonio D. Albertini, M.D., Ave. de Bruselas #20, Reparto Kohly, Marianao, Habana, Cuba, President, Finlay Institute.

Clifford R. Eskey, M.D., Rm. 204, Federal Office Bldg., San Francisco, Calif., Investi-

gating Sylvatic Plague in western states, U. S. Public Health Service

Charles F. McKhann, M.D., 300 Longwood Ave., Boston, Mass., Assistant Professor of Pediatrics and Communicable Diseases, Harvard School of Public Health

Pedro Nogueira, M.D., c/o Dr. Carr, Apartado 157, Havana, Cuba, Field Director, Comision de Malaria de Cuba

Unaffiliated

N. Talley Ballou, D.D.S., State Dept. of Health, Richmond, Va., Director of Mouth Hygiene

Walter T. Davis, M.D., Joe Wheeler Dam, Ala., with Tennessee Valley Authority

Mihkel Kask, M.D., Institute of Hygiene, University of Tartu, Tartu, Estonia, First Assistant

Paul A. Lembcke, M.D., 79 Madison Ave., New York, N. Y., Assistant Director of Medical Care, F.E.R.A.

Kenneth M. Wilson, 386–4th Ave., New York, N. Y., Finacial Secretary, New York Tuberculosis and Health Assn.

DECEASED MEMBERS

Carroll Fox, M.D., Rosebank, S. I., N. Y., Elected Member 1915, Fellow 1922

J. E. Rush, M.D., Pittsburgh, Pa., Elected Member 1914, Fellow 1922

P. A. Bendixen, M.D., Davenport, Ia., Elected Member 1934

Edward L. Kingman, M.D., Newton, Conn., Elected Member 1935

Annie D. MacRae, M.D., San Francisco, Calif., Elected Member 1920

Cesar Molinas Opisso, Barcelona, Spain, Elected Member 1933

Mabel L. Smyth, Honolulu, T. H., Elected Member 1928

APPLICANTS FOR FELLOWSHIP

In accordance with the By-laws of the Association, the names of applicants for Fellowship are officially published herewith. They have requested affiliation with the Sections indicated. Action by the various Section Councils, the Committee on Fellowship and Membership, and the Governing Council will take place between now and the time of the New Orleans Annual Meeting.

HEALTH OFFICERS SECTION

Henry D. Chadwick, M.D., Boston, Mass.

Raymond D. Fear, M.D., Dr.P.H., Stamford, Conn.

Andrew J. Krog, Plainfield, N. J.

James R. McEachern, M.D., Tampa, Fla.

K. E. Miller, M.D., Evanston, Ill.

William H. F. Warthen, M.D., Baltimore, Md.

LABORATORY SECTION

Chester S. Bowers, B.S., Hartford, Conn.

Thomas D. Kendrick, M.D., D.P.H., Rochester, Minn.

VITAL STATISTICS SECTION

Robert J. Vane, New York, N. Y.

PUBLIC HEALTH ENGINEERING SECTION

Thomas R. Camp, B.S., S.M., Cambridge, Mass.

Malcolm Pirnie, S.B., M.C.E., New York, N. Y.

FOOD AND NUTRITION SECTION

Milton E. Parker, S.B., Danville, Ill.

CHILD HYGIENE SECTION

Arville O. DeWeese, M.D., Kent, O.

Martha M Eliot, M.D., Washington, D. C.

PUBLIC HEALTH EDUCATION SECTION

Thomas G. Hull, M.S., Ph.D., Chicago, Ill.

Lucy S. Morgan, M.S., M.A., New Haven, Conn.

PUBLIC HEALTH NURSING SECTION

Geneva F. Hoilien, Ithaca, N. Y.

Lillian A. Hudson, B.S., A.M., New York, N. Y.

Donna M. Pearce, B.S., R.N., Nashville, Tenn.

EPIDEMIOLOGY SECTION

Arthur H. Cummings, M.D., C.P.H., Albany, N. Y.

Frederick S. Leeder, M.D., D.P.H., Coldwater, Mich.

James E. Perkins, M.D., Dr.P.H., Amsterdam, N. Y.

Milton V. Veldee, M.S., M.D., Washington, D. C.

UNAFFILIATED

George Baehr, M.D., New York, N. Y.

George B. Darling, Dr.P.H., Battle Creek, Mich.

Charles G. Giddings, Jr., M.D., Atlanta, Ga.

Frank Kiernan, A.B., New York, N. Y.

Eleanor J. Macdonald, A.B., Boston, Mass.

Robert E. Wodehouse, M.D., D.P.H., Ottawa, Ont., Canada

NEWS FROM THE FIELD

UNIVERSITY OF CALIFORNIA AT LOS ANGELES—SUMMER SESSION

SUMMER school courses in Public Health and Nursing Education are being given at the University of California at Los Angeles as follows:

June 27–August 7, 1936

Elementary Epidemiology
Vital Statistics
Principles and Practice of Public Health Nursing
Principles of Supervision in Public Health Nursing
Administration of Schools of Nursing
Principles of Nursing Education
Administration of the School Health Program
Essentials of Nutrition
The Relation of Diet to the Treatment of Disease
Social Case Work
Principles of Teaching as Applied to Home Hygiene Courses
Methods in Teaching Home Hygiene Courses
Maternal and Child Welfare

For information, write to the Dean of the Summer Session of the University, 405 Hilgard Avenue, Los Angeles, Calif.

WAGNER COLLEGE

A COURSE in bacteriology will be offered in the Summer Session of Wagner College, Staten Island, N. Y., from July 6 to August 15.

It is stated that this course is to be of particular interest to college students majoring in the biological sciences and to public health workers, and is a prerequisite for courses in serology, clinical pathology, and blood chemistry, offered in the fall and spring sessions as part of the curriculum for laboratory technicians.

HARVARD PUBLIC HEALTH DEGREES FOR WOMEN

WOMEN will be permitted to take degrees at the School of Public Health of Harvard University.

In the past, women have been eligible for the Certificate of Public Health upon completion of a course of study at the School of Public Health. Now they may become candidates for the degree of Doctor of Public Health or Master of Public Health, on the same basis as men students. In order to become candidates for either degree applicants must satisfy the Administrative Board of their academic fitness by a medical degree or its equivalent, from an approved medical school.

FELLOWSHIPS IN PUBLIC HEALTH

MORLEY B. BECKETT, M.D., of Lansing, Mich., member A.P.H.A., has been appointed to the staff of the W. K. Kellogg Foundation to work out the details for a fellowship system to enable graduate students in public health administration and kindred fields to obtain practical experience, it is reported.

Two full-time fellowships are now being planned, for which applicants must be graduates of recognized schools with special training in the public health field. Dr. Beckett plans to devote six months to the development of these fellowships.

Dr. Beckett, formerly Director of County Health Administration of the Michigan State Health Department, has served with the Health Department of Cleveland, as Assistant Health Commissioner of Saginaw, and Health Officer of Isabella County, Mich.

NORTHWESTERN UNIVERSITY SAFETY RESEARCH

AN Institute of Public Safety has been established at Northwestern University, to be financed by the Automobile Manufacturers' Association and

the university. It will be a research laboratory for traffic safety problems and headquarters for the traffic control program of the International Association of Chiefs of Police.

The Institute will coöperate with the National Safety Council in its campaign for traffic death reduction, install traffic accident prevention bureaus in selected cities and states, provide traffic information service to police departments, and assist in improving traffic curricula by coöperating with Harvard University's accident prevention bureau and other agencies.

Franklin M. Kreml, police lieutenant in Evanston, Ill., which has won the National Safety Council's "safest city" award three times in the last 4 years, was appointed Director of the Institute.—*J.A.M.A.*, May 2, 1936.

CONGRESS OF JEWISH PHYSICIANS

THE first World Congress of Jewish Physicians was held in Jerusalem at the Hebrew University in Tel Aviv on April 21–24.

The program included reports on the situation of Jewish physicians; reports on medical education, hygienic conditions of the Jewish population in Palestine and other countries with large Jewish population, Jewish institutions for preventive medicine and sanitary service, foundation of a world union of Jewish physicians, and scientific lectures on anthropology and eugenics.

MASSACHUSETTS NEW HEALTH UNIT

A NEW health unit has been organized in Franklin County to serve the towns of Monroe, Rowe, Heath, Charlemont, Irving, and Shutesbury, Mass.

The unit, which began to function April 1, will be maintained by federal and state funds until other towns join, it was reported. Walter W. Lee, M.D., member A.P.H.A., of North Adams, Mass., is in charge.

DR. LONG ELECTED PRESIDENT OF NATIONAL TUBERCULOSIS ASSOCIATION

AT the meeting of the National Tuberculosis Association, at New Orleans in April, Esmond R. Long, M.D., member A.P.H.A., Director of the Henry Phipps Institute of the University of Pennsylvania, was elected President of the National Tuberculosis Association, to succeed James J. Waring, M.D., member A.P.H.A., of Denver, Colo.

Hugh S. Cumming, M.D., Fellow A.P.H.A., former Surgeon General of the U. S. Public Health Service, was elected an honorary member. The Trudeau Medal of the Association was awarded to Dr. Edward W. Archibald, Professor of Surgery at McGill University, Montreal, and Consulting Surgeon at the Royal Victoria Hospital for his work on thoracic surgery.

METROPOLITAN HEALTH OFFICERS CONFERENCE

HEALTH officers of three states, New York, Connecticut, and New Jersey, met June 5 at the New York City Health Department offices and organized the Metropolitan Health Officers Conference. Its aim is to bring to the metropolitan area greater uniformity in administrative procedure in public health, closer coöperation in health problems, and closer personal relationships.

Matthias Nicoll, Jr., M.D., Fellow A.P.H.A., Commissioner of Health of Westchester County, N. Y., was elected temporary chairman of the conference, and Charles F. Bolduan, M.D., Fellow A.P.H.A., Director of the Bureau of Health Education of the New York City Health Department, was named temporary executive secretary.

This session was devoted to three main topics: Rabies and the Dog Control Problem; Food Poisoning—pastry products mainly; and Milk Grading.

NEW YORK ILLEGITIMACY BILL SIGNED

GOVERNOR LEHMAN signed a bill, on June 4, designed to help remove the stigma of illegitimacy from children born out of wedlock by providing that State birth certificates need not disclose the marital name or status of the mother.

Provision is made in the bill, which was drafted by a special commission appointed by Governor Lehman, that there shall be no specific statement on the birth certificate as to whether the child was born in wedlock or not.

HOMER FOLKS TUBERCULOSIS HOSPITAL

THE New York State Legislature recently passed a bill providing that the new State Tuberculosis Sanatorium located at Oneonta, N. Y., should be named the Homer Folks Tuberculosis Hospital, in honor of Homer Folks, F.A.P.H.A., for many years Secretary of the State Charities Aid Association, New York, and member of the New York Public Health Council. The new hospital is to be dedicated in July by Governor Lehman.

The first of the new tuberculosis hospitals recently opened by New York State has been named after the late Dr. Hermann M. Biggs, former State Commissioner of Health.

STUDENT HEALTH SURVEY

STUDENTS entering the University of California and Leland Stanford University, Calif., in the fall of 1935, are to be the subject of a 10 year study, according to the *Bulletin* of the National Tuberculosis Association. The physical histories of these students, numbering about 5,000, will be kept in the two universities, and follow-up records will be kept following graduation.

A permanent research committee has been established with representatives of all supporting tuberculosis associations participating, together with representatives of the student health services in the universities and a research adviser.

The expense of the research is to be borne by the regional tuberculosis associations and by the institutions coöperating.

SOUTH CAROLINA HEALTH OFFICERS

NEW Health Officers for districts and counties in South Carolina have been announced as follows:

Dr. Gordon R. Westrope, of Columbia, S. C.—Cherokee County

Dr. John Y. O'Daniel, of Erwin, Tenn.—Marlboro County

Dr. George Fletcher Reeves, of Goldsboro, N. C.—Colleton County

Dr. Edward P. White, of Gaffney, S. C.—Richland County

Dr. William Burns Jones, of Columbia, S. C.—Chester and Union Counties

Dr. Thomas B. Phinizy, of Augusta, Ga.—Bamberg, Allendale, and Barnwell Counties

OHIO HEALTH DEPARTMENTS MERGE

THE Hocking and Vinton County Health Departments have merged, forming a new district health department, under the supervision of Dr. Walter B. Lacock, Health Commissioner of Hocking County.

Dr. Herbert D. Chamberlain, of McArthur, Ohio, Health Officer of Vinton County, will retire.

PERSONALS

FRIEND LEE MICKLE, F.A.P.H.A., of Hartford, Conn. (Secretary of the Laboratory Section, A.P.H.A.), received the honorary degree of Sc.D. at the 25th Commencement of Allegheny College, Meadville, Pa., on June 8.

CHARLES F. WILINSKY, M.D., Fellow A.P.H.A., of Boston, Mass., has been appointed Chairman of the Committee on Public Health Relations of the American Hospital Association. His predecessors were Surgeon General Hugh S. Cumming, M.D., and Milton J. Rosenau, M.D.

G. HOWARD GOWEN, M.D., member A.P.H.A., on July 1 assumes the duties of Assistant Epidemiologist, in the Illinois Department of Public Health, Springfield. He will continue his affiliation with the University of Illinois College of Medicine in Chicago.

ANNA W. WILLIAMS, M.D., F.A.P.H.A., formerly Assistant Director of the Research Laboratory of the New York City Department of Health, received on April 27, in recognition of her 40 years of service to New York City, a testimonial scroll presented by the Women's Medical Society of New York State. The presentation was made by S. Josephine Baker, M.D., F.A.P.H.A., President of the Society.

EDWIN O. JORDAN, PH.D., F.A.P.H.A., Professor of Bacteriology and Chairman of the Department at the University of Chicago, has been elected a member of the National Academy of Science.

RICHARD ARTHUR BOLT, M.D., DR.P.H., F.A.P.H.A., Director of the Cleveland Child Health Association, and Associate in Pediatrics and in Public Health and Hygiene at Western Reserve University, Cleveland, Ohio, is conducting courses in Elementary Epidemiology, Vital Statistics, and Administration of the School Health Program, in the Summer School of Public Health and Nursing Education, of the University of California at Los Angeles, this summer.

DR. MARSHALL C. BALFOUR, representative in Greece of the International Health Board of the Rockefeller Foundation, according to the *Journal of the American Medical Association*, has been awarded the Silver Medal for Distinguished Services by the Greek Academy of Sciences, Arts and Letters, in recognition of research in the field of malaria control.

R. G. BEACHLEY, M.D., F.A.P.H.A., who for years has been Deputy State and County Health Officer at Chestertown, Md., has accepted a position as Deputy Director of Rural Health for Virginia at Abingdon, with 14 counties in his district.

DR. FRANK W. PARKER, JR., has been appointed Health Officer of the Tenth Health District of New Mexico, with headquarters at Silver City, N. M.

DR. EDWARD ROBINSON BALDWIN, Director of the Edward L. Trudeau Foundation, Saranac Lake, N. Y., was presented with the Kober Medal at the annual meeting of the Association of American Physicians in Atlantic City, N. J., May 6. The medal is awarded each year.

ALVIN R. LAMB, PH.D., formerly of the U. S. Public Health Service and the Leprosy Investigation Station, Honolulu, has become research associate at the Experiment Station of the Hawaiian Sugar Planters' Association, Honolulu.

KARL F. MEYER, PH.D., F.A.P.H.A., Director of the Hooper Foundation for Medical Research, University of California Medical School, San Francisco, Calif., received the honorary degree of Doctor of Medicine. This was conferred on him by the College of Medical Evangelists, of Los Angeles, on April 23.

DR. WILLIAM E. STEELE, of Olympia, Wash., has been appointed Medical Director in the Washington State Department of Labor and Industries, to succeed Dr. Harry Eugene Allen, of Seattle, resigned. Dr. Harry L. Leavitt, of Seattle, has been appointed Assistant Director to succeed Dr. Steele.

JAMES THOMAS CULBERTSON, PH.D., instructor in bacteriology, Columbia University, New York, has received a fellowship from the John Simon Guggenheim Memorial Foundation for study of immunity against para-

sitic diseases at the London School of Hygiene and Tropical Medicine. Michael Heidelberger, Ph.D., associate professor of biologic chemistry at Columbia, received a renewal of a grant for study of immune reactions.

DR. AUGUSTUS L. L. BAKER, of Dover, N. J., has been appointed a member of the New Jersey State Board of Health, to succeed Dr. Samuel A. Cosgrove, of Jersey City, whose term expired.

HENRY C. GAHAGAN, M.D., of Shreveport, La., has been appointed Director of the Coushatta Health Unit, succeeding Bernard Hochfelder, M.D., member A.P.H.A., resigned.

LEONARD A. DEWEY, M.D., member A.P.H.A., of Portales, N. M., who has been Acting Health Officer of the Tenth Health District of New Mexico, with offices at Silver City, N. M., has been appointed Epidemiologist in the New Mexico State Health Department.

EDYTHE P. HERSHEY, M.D., member A.P.H.A., Director of Health in the Dallas public schools, has been appointed Director of the Child Health and Maternity Divisions of the Texas State Health Department.

DR. ROBERT J. JAEHNE, of Austin, was recently named Health Officer of Travis County, Tex.

DR. MACK I. SHANHOLTZ, of Beckley, W. Va., has been appointed Director of the health district comprising Bristol and Washington Counties, with headquarters at Bristol, Va.

CHARLES L. SAVAGE, M.D., member A.P.H.A., of Charlottesville, has been appointed Director of the Buchanan-Russell-Tazewell Health District, with headquarters at Richlands, Va.

DR. ROBERT J. LANNING, of Junction City, has been named County Physician and Health Officer of Geary County, Kans., succeeding the late William S. Yates, M.D., member A.P.H.A.

GUY R. POST, M.D., member A.P.H.A., Director of the tricounty health unit of Newaygo, Oceana, and Lake Counties, with offices at White Cloud, Mich., has been named to a similar position with a newly organized unit in Mecosta and Osceola Counties, with headquarters in Big Rapids.

DR. NINA C. WILKERSON has been appointed Health Officer of Sturgis, Mich., succeeding Dr. Charles G. Miller.

DR. NEAL J. MCCANN has been named Health Officer of Ishpeming, succeeding Dr. Joseph P. Bertucci.

THEODORE MEYER, M.D., DR.P.H., member A.P.H.A., Health Officer of Van Buren County, Mich., has been appointed Health Officer of St. Louis County, with headquarters at Clayton, Mo.

DR. WILLIAM M. TAPPAN has been appointed Health Officer of Holland, Mich., succeeding Dr. William Westrate.

FREDERICK FULLER RUSSELL, M.D., F.A.P.H.A., lecturer in Preventive Medicine and Hygiene and Epidemiology, Harvard Medical School, Boston, and formerly Director of the International Health Division of the Rockefeller Foundation, has been awarded the Public Welfare Medal of the National Academy of Sciences.

THURMAN B. RICE, M.D., F.A.P.H.A., Assistant Director of the Indiana State Health Department, has been named Director of Physical and Health Education in charge of the new program of child health that has been announced for the public schools of Indiana as part of the state's activities in connection with the federal government's social security plan.

LESLIE A. LAMBERT, M.D., member A.P.H.A., City Health Officer of Flint, Mich., became Head of the State Bureau of the local health service in Idaho, a job corresponding to state health officer.

DR. SHALER A. RICHARDSON, of Jacksonville, Fla., has been appointed a member of the Florida State Board of Health, succeeding the late Harry Dash Johnson, of Daytona Beach.

HARRY R. DESILVA, PH.D., of Amherst, Mass., has resigned as professor of psychology in charge of the psychologic laboratory, Massachusetts State College, to join the staff of the Bureau for Street Traffic Research of Harvard University.

DR. EDWIN M. MAHONEY was elected Secretary of the newly appointed Health Board of Holyoke, Mass. Other members are Arthur Hebert, Chairman, and Dr. Joseph W. Wonsik.

DR. HENRY C. LINDERSMITH, of Sherwood, Ohio, has been appointed Health Officer of Defiance County.

DR. CHARLES J. HATFIELD, Director of the Henry Phipps Institute, University of Pennsylvania, Philadelphia, Pa., has been appointed official representative of the National Tuberculosis Association for the conference of the International Union Against Tuberculosis to be held in Lisbon, Portugal, September 7–10.

CHARLES P. DRURY, M.D., member A.P.H.A., for 8 years secretary of the county medical society, was appointed Health Officer of Marquette, Mich., effective April 1, succeeding the late Frederick McD. Harkin, M.D., member A.P.H.A.

DR. WELLS F. SMITH, of Little Rock, has been elected President of the Arkansas State Board of Health.

DR. CHARLES D. LIPSCOMB, of Quitman, Tex., was recently appointed Health Officer of Wood County.

DR. HOWARD E. M. BOOCKS, of Logan, Ohio, has been appointed Health Officer of Logan County.

DR. JOHN B. H. BONNER, of Beaumont, Va., was appointed Director of the Sussex County Health District, with headquarters in Stony Creek.

DR. JOHN S. COOPER, of Greenville, Tex., has been appointed City Health Officer, to succeed Dr. Benjamin F. Arnold.

ELMER G. BALSAM, M.D., member A.P.H.A., of Billings, Mont., has been reappointed a member of the Montana State Board of Health.

DR. LAWRENCE ISENHART has been named to succeed Dr. Samuel P. Colehour, resigned, as Health Officer of Mount Carroll, Ill.

DR. WALTER E. MERCER, for 4 years Health Officer of Webberville, Mich., has been placed in charge of the Bureau of Child Health of the Lansing Department of Health.

DEATH

CARROLL FOX, M.D., F.A.P.H.A., Head of the U. S. Quarantine Station at Rosemont, S. I., N. Y., died on May 14. He has been a member of the A.P.H.A. since 1915 and was a Charter Fellow. He served in the U. S. Navy during the War, and later entered the U. S. Public Health Service. C. V. Atkin, M.D., will take over the direction of the Quarantine Station pending an official appointment in Washington.

WILLIAM S. YATES, M.D., member A.P.H.A., Health Officer of Geary County, with offices at Junction City, Kans., died recently.

FREDERICK MCD. HARKIN, M.D., member A.P.H.A., of Marquette, Mich., died in March, 1936.

JAMES H. PAUL, M.D., of Jamesville, N. Y., died recently. Dr. Paul had been Health Officer of Dewitt since 1912.

CONFERENCES AND DATES

June 6–Nov. 29, Medical Exhibit "Story of Life," in Texas Centennial Exposition, Dallas, Tex.

June 15–Aug. 21, Speech Conference, University of Denver, Denver, Colo.

July, Third International Conference on Social Work Problems, London.

July 9–20, Exhibit of Educational Publications, New York University (Summer Session), 29 Washington Place, New York, N. Y.

July 6–10, 29th Annual Meeting of the American Home Economics Association, Olympic Hotel, Seattle, Wash.

July 6–11, The Royal Sanitary Institute, Southport, England.

July 13–17, American Dental Association, San Francisco, Calif.

July 15–17, League of South Dakota Municipalities, Rapid City, S. Dak.

July 18–23, Third International Open Air School Congress, Bielefeld and Hanover, Germany.

July 19–23, International Convention for the Health of University Students, Athens, Greece.

July 20–24, Oklahoma Water and Sewage Conference, Stillwater, Okla.

July 25–Aug. 1, The Second International Congress of Microbiology, London.

July 27–29, Annual Meeting, Union of Canadian Municipalities, Vancouver, B. C.

Aug. 2–8, Annual Meeting, National Institute for Commercial and Trade Organization Executives, Northwestern University, Evanston, Ill.

Aug. 11–14, American Veterinary Medical Association, Deshler-Wallick Hotel, Columbus, O.

Aug. 16–22, National Hospital Association, Philadelphia, Pa.

Aug. 16–22, National Medical Association, Philadelphia, Pa.

Aug. 18–20, League of Iowa Municipalities, Davenport, Iowa.

Aug. 19–21, Annual Meeting—Central States Section, American Water Works Association, Hotel Cleveland, Cleveland, Ohio

Aug. 29–Sept. 6, Third Postgraduate Course of the International Hospital Association, Prague, Czechoslovakia.

Aug. 31–Sept. 12, Harvard Tercentenary Conference of Arts and Sciences, Cambridge, Mass.

Sept. 2–4, Annual Convention, Union of Nova Scotia Municipalities, Digby, Nova Scotia.

Sept. 2–4, Annual Meeting, Ontario Municipal Association, Toronto, Ont.

Sept. 7–10, International Union Against Tuberculosis, Lisbon, Portugal.

Sept. 7–12, Third World Power Conference, National Power Policy Committee, Department of the Interior Building, Washington, D. C.

Sept. 14–17, Annual Convention, League of California Municipalities, Santa Monica, Calif.

Sept. 14–17, Annual Meeting, California Sewage Works Association, Santa Monica, Calif.

Sept. 15–30, First International Congress of Sanatoria and Private Nursing Homes; Margitsziget, Sanatorium, Budapest, Hungary.

Sept. 21–23, Annual Convention, American Institute of Park Executives and the American Park Society, South Bend, Ind.

Sept. 21–23, Annual Meeting, Rocky Mountain Section—American Water Works Association, Denver, Colo.

Sept. 22–25, Annual Meeting—New England Water Works Association, Pennsylvania Hotel, New York, N. Y.

Sept. 23–25, Annual Meeting of the New York State Association of Dairy and Milk Inspectors, Van Curler Hotel, Schenectady, N. Y.

Sept. 23–26, Mississippi Valley Conference on Tuberculosis, The Mississippi Valley Sanatorium Association,

Hotel Pere Marquette, Peoria, Ill.

Sept. 24–25, Annual Meeting, League of Wisconsin Municipalities, Manitowoc, Wis.

Sept. 28–30, Public Works Congress—American Society of Municipal Engineers—International Association of Public Works Officials, Toronto, Ont.

Sept. 28–Oct. 2, American Hospital Association, Cleveland, O.

Oct. 5–9, Annual Safety Congress and Exposition, National Safety Council, Atlantic City, N. J.

Oct. 10–18, National Dairy Show, Dallas, Tex.

Oct. 12–15, Annual Convention—Southwest Section, American Water Works Association, Fort Smith, Ark.

Oct. 12–17, The Dairy Industries Exposition, Atlantic City, N. J.

Oct. 12–18, Third International Congress on Malaria, Madrid, Spain.

Oct. 14–16, Annual Convention, Pennsylvania Water Works Association, Haddon Hall, Atlantic City, N. J.

Oct. 14–17, Annual Civil Service Assembly of the United States and Canada, Cincinnati, Ohio.

Oct. 17–25, Centennial Exposition Dairy Show, Atlantic City, N. J.

Oct. 19–21, Annual Meeting, International City Managers' Association, Richmond, Va.

Oct. 20–23 (Tues., Wed., Thurs., Fri.), Sixty-fifth Annual Meeting of the American Public Health Association, New Orleans, La. Meetings Headquarters, Municipal Auditorium; Residence Headquarters, Hotel Roosevelt.

Oct. 20–23, American Association of School Physicians, Hotel Roosevelt, New Orleans, La.

Oct. 21–23, Ontario Hospital Association, Toronto, Ont.

Oct. 26–28, Annual Meeting—Missouri Valley Section, American Water Works Association, Kansas City, Mo.

Oct. 26–28, National Association of Exterminators & Fumigators, Cleveland, Ohio.

Oct. 26–28, Annual Meeting, North Carolina Section—American Water Works Association, Hotel Charlotte, Charlotte, N. C.

Oct. 29–31, Annual Meeting of the Association of Military Surgeons, Detroit, Mich.

Nov. 8–11, Annual Meeting, National Association of Commercial Organization Secretaries, Omaha, Nebr.

Nov. 9–12, Association of Dairy, Food and Drug Officials of the United States, Miami Biltmore Hotel, Coral Gables, Fla.

Nov. 9–15, American Education Week. Write: Educational Press Assn., N. J. *Educational Review,* 605 Broad Street, Newark, N. J.

Nov. 11–13, Refrigeration Service Engineers Society, Hotel Gayoso, Memphis, Tenn.

Nov. 17–20, Southern Medical Association, Baltimore, Md.

Dec. 28–30, Society of American Bacteriologists, Indianapolis, Ind.

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